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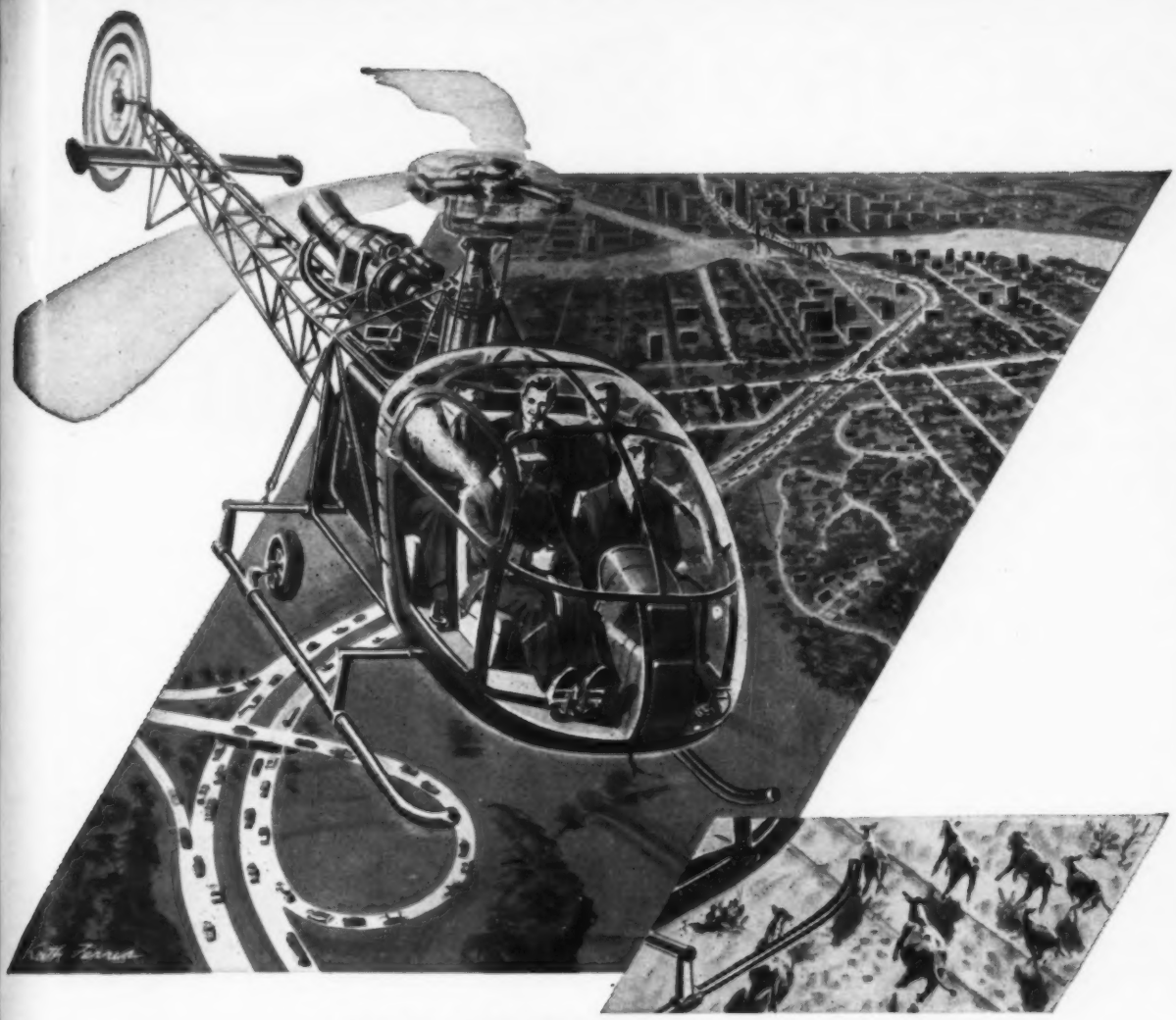

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AMERICAN AVIATION

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ONE

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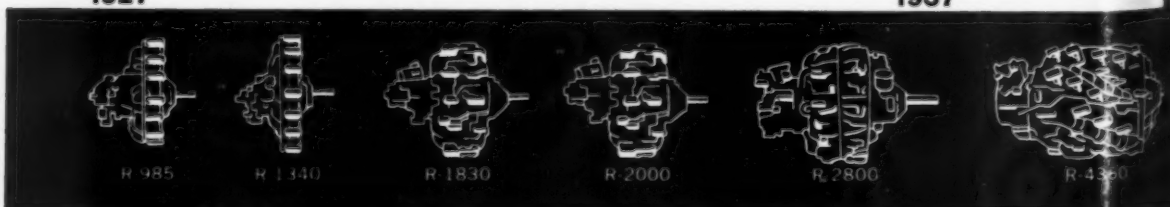

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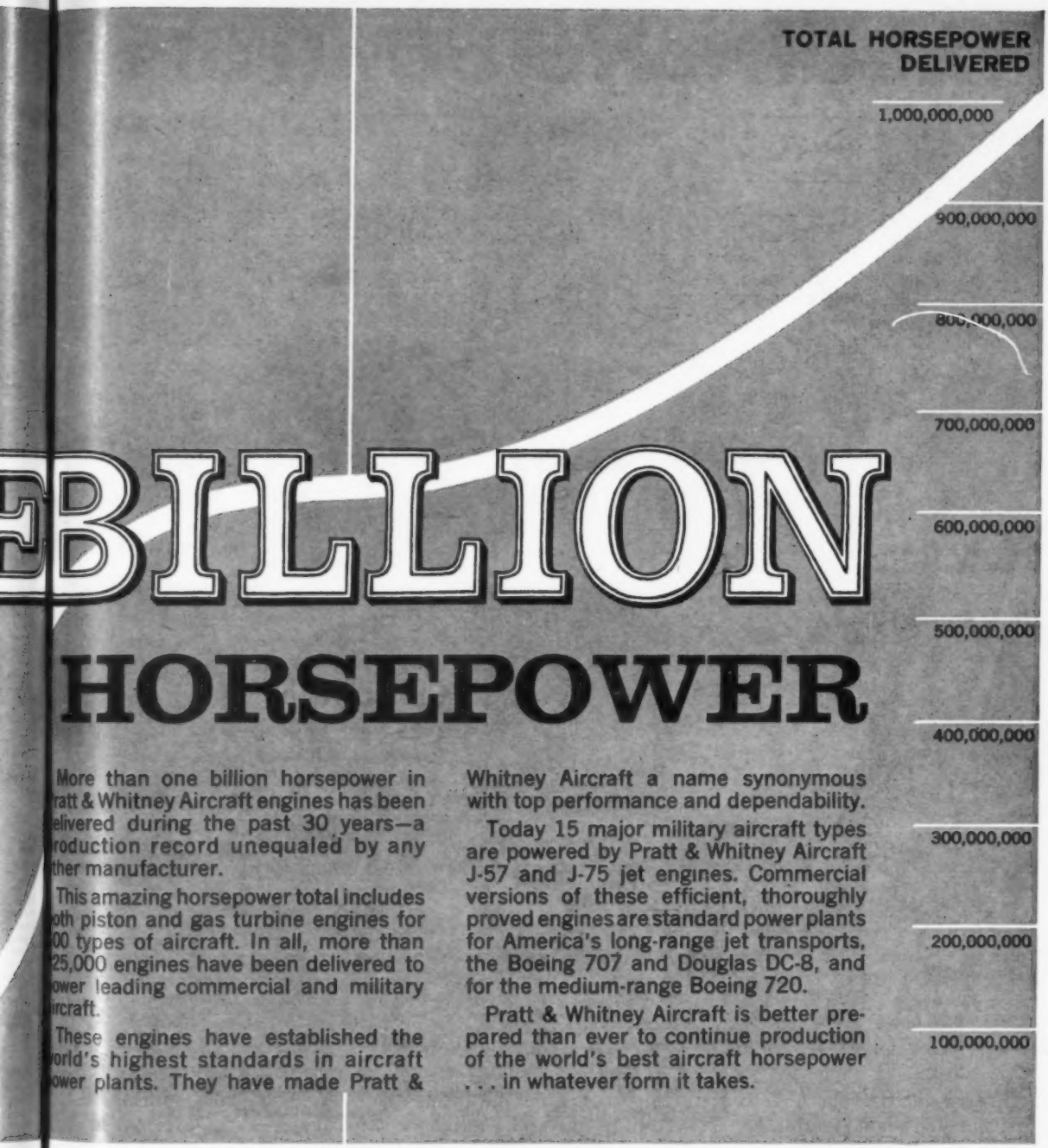

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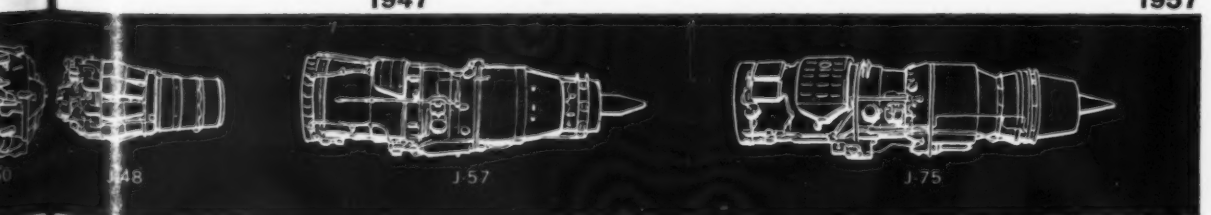

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Coming: A New Federal Aviation Agency

MOMENTOUS things are stirring for civil aviation in the United States. They affect directly every manufacturer of components, accessories, engines and airframes, as well as all of the owners and operators of civil/commercial airplanes.

By next Jan. 15, the Administration must (by law) submit to Congress a completed legislative program for a new Federal Aviation Agency. The significance of this proposal can scarcely be overestimated.

It is time a new agency with broad powers of national policy be established.

Frequently on this page we have been highly critical of the five-man Civil Aeronautics Board, blaming this agency in large measure for failure to cope with the multitude of problems now facing civil aviation. While we feel this criticism has been valid, the truth of the matter is that the governmental structure itself has become obsolete. Despite the magna carta franchise given by Congress to CAB, this small agency, isolated in the massive government structure, has become too immersed in regulatory details to see the broad picture.

A new overriding agency is needed to absorb CAB, CAA and as many functions as are proper from the more than 50 government agencies which are dealing with aviation in one form or another.

At this stage, no one knows what form the Administration proposal will take. It could be a new Department of Aviation with cabinet status, although the likelihood of such a move is not very great. It could be an enlargement of aviation activities within an existing Department, such as Commerce. Better yet—and this is the trend of planning—is an independent agency adopting the name already suggested—Federal Aviation Agency.

But whatever the precise proposal, it concerns every segment of the aviation industry from big airframe and engine firms to the manufacturers of spark plugs and communications equipment and on through the aeronautical spectrum to every operator of airplanes and the airports used by same.

Civil—or commercial—aviation must rally together if the U.S. is to build a civil air power commensurate with the nation's needs. Passage of a sound legislative program by Congress will not be easy. There will be efforts by railroad and other interests to merge aviation into an overall transportation agency. The only sound solution is an agency beholden to aviation exclusively.

The legislative drafting is under the direction of Ford Luikart, first staff director of the President's Advisory Committee on Government Organization, the so-called Rockefeller Committee, who was brought to the job by Presidential Assistant Elwood Quesada.

One objective of a new overriding agency, it is to be hoped, is to overcome on a top policy level the tragic fumbling of CAB with regard to fares and financing of new airline equipment. But this is only one phase. The new agency would be a powerful guide and spokesman for civil aviation in the U.S. in a multitude of ways.

Keep a sharp eye out for the legislative proposal. Within a few months there should be something to examine. This is the biggest and best opportunity for civil aviation to attain a high and powerful standing within the government. It looks good as of now. Let's not let it get sidetracked.

The Amazing Mr. Kloepfer

If life should ever tend to get dull in Washington, the CAB has a publicity man to liven things up. He is Mr. William Kloepfer, Jr., Chief, Office of Information, a high-sounding title for what used to be known as press agent. Inexperienced in the general field of public relations, Mr. Kloepfer is making quite a name for himself.

Early in January, he issued a press release that raised eyebrows in every newspaper office in the country. The release announced public hearing dates for a major airline accident, but was worded melodramatically in such a fashion as to constitute a promotional buildup for the hearing. It even went a long way toward drawing conclusions as to the cause of the accident. Not only was the release in extreme bad taste but was amateurish in concept. No newspaper carried a line on it, of course.

Now Mr. Kloepfer has stepped forth with another amazing production. On March 14 he held a press conference to announce that the CAB had decided against expediting the General Fare Investigation as some carriers had requested.

But that wasn't enough for Mr. Kloepfer. He proceeded to lambast the press for criticizing the CAB's footdragging in facing up to the current airline financial crisis. He then revealed that he was sending a letter to many press media "setting them straight" on the CAB and the fare investigation.

Well, that's all just dandy, except that the press of the nation will continue to blast CAB on the fare question until CAB recognizes what everybody else in the country seems to know full well—that the air transport industry has deteriorated very seriously and that the present crisis is going to get a lot worse unless CAB moves for more relief.

CAB had better transfer Mr. Kloepfer to another spot and hire an experienced public relations man. He's heading into deep water and he doesn't know how to swim.

Wayne W. Parrish

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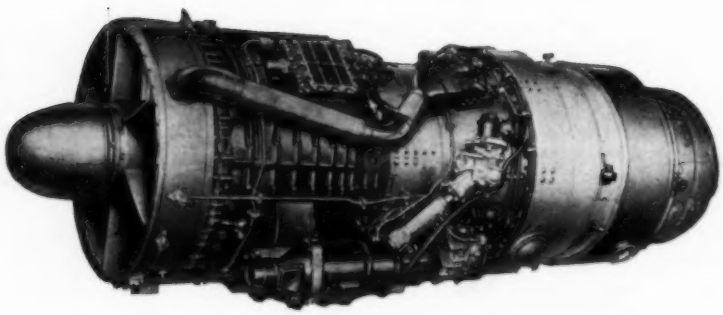

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AIRTRENDS

Recession-wary legislators on Capitol Hill are setting their sights on Pentagon's huge fiscal reserve of unobligated and unapportioned funds. Their target: faster obligation of some $2 billion in military construction money to bolster the sagging economy. And pressures will continue to mount as long as business slump lasts.

Some lawmakers would even go a step farther. They seek speed-up in expenditure of several additional billions in unapportioned military hardware funds, although much of this is reserved against long lead-time items.

Air Force, meanwhile, has labeled specific projects it could accelerate if Pentagon releases $1.1 billion in unapportioned funds. On the list are Convair B-58 production, North American B-70 chemical bomber development, more ballistic-missile carrying Douglas C-133A turboprop transports, and missiles.

Bucking the trend is Rep. George Mahon (D.-Tex.). Mahon has warned that the military appropriations subcommittee he heads intends to ride herd on any accelerated spending activity, will hold the Pentagon accountable if a wild spending spree ensues.

Watch for early release, possibly next month, of a comprehensive report on Pentagon information policies. Document is now being prepared by House Government Information subcommittee and reportedly will charge super-secrecy-minded bureaucrats with hampering the defense effort.

Follow-on request for an additional $1.3 billion in appropriations for fiscal 1959 will bring Defense Dept.'s total for the year to about $40.4 billion. Major share of the new money bid is for an additional wing of Boeing B-52s, with later consideration to be given to a necessary boost in KC-135 jet tanker production to continue to serve the bombers on a 3-to-2 ratio.

Despite missile emphasis, stakes in manned aircraft program competitions are still running high. Lockheed, for example, looks to $500 million in new orders if successful in two specific projects. One reportedly would involve about 200 Electras for Navy antisubmarine warfare use. Another would bring production of up to 100 F-104s if company is successful in competition for anticipated West German order for a modern jet fighter.

Complexity of new military weapons is taking its toll in a new fiscal area. Defense Dept., in appeal for two-year extension of Renegotiation Act, argues that complexity makes it even harder to predict excess profits. Renegotiation Board itself told Congress it has enough work to last until 1961, that it is now in the middle of considering 1954 and 1955 cases.

And despite bitter complaint of industry about administration of the act, all indications are it will clear Congress in its present form—perhaps with a reaffirmation of the law's original intent.

Look for further decentralization of Air Materiel Command procurement functions. More and more responsibility is slated to be transferred to Air Materiel Areas for supply management and procurement. Latest trend is to make a single AMA responsible for a total system or subsystem, rather than to split the responsibility as has been the case over the years.

For transport trends and news at deadline, see pages 59-62.

INDUSTRY At Deadline

Congress gets bill to throttle buildup of military maintenance

Dwindling commercial aircraft maintenance business in the face of a big buildup of military overhaul activities has come under congressional fire again.

This time objection to military competition has been framed in legislation. A bill, by Rep. Edgar W. Hiestand (R-Calif.), would direct the award of all aircraft maintenance, overhaul and modification to private concerns capable of doing the work.

The measure is in line with Rep. Harry Sheppard's (D-Calif.) recommendation that maintenance work connected with a speed-up of the dispersal of SAC bases be handled in private facilities.

The Hiestand proposal is called the "Anti-Military Aircraft Workshop Competition Act." It would stamp Congressional endorsement on a policy aimed at barring military maintenance and overhaul work except in expressly designated emergencies.

The measure would also:

Require Presidential approval of any proposed military aircraft maintenance work to be done by the military.

Require the Defense Secretary to submit a report to the Budget Bureau Director describing the planned projects. "No activity shall be performed, and no funds expended therefor, except in time of war, within ninety days after such report is made," the bill said.

The bill has been sent to the House Armed Services Committee. No hearings have been set. The unit has a big backlog and it is doubtful if it will consider the measure soon. Meanwhile, the committee has asked for reports from the Defense Department and the Budget Bureau.

Rep. Hiestand represents a California district containing a number of maintenance and overhaul plants. He told AMERICAN AVIATION his measure is primarily designed to force the military out of competition with taxpaying citizens.

He explained that maintenance and overhaul contracts began dwindling in last summer's Pentagon fiscal retrenchment. Caught in the financial squeeze, the military stepped up its own maintenance activities.

Now that budget ceiling has been lifted, the military has no excuse for hoarding maintenance work that can be done at less expense by private contractors, he indicated.

Umbaugh proposes VTO gyroplane

NEW TWO-PLACE autogyro aimed at the private flying segment of aviation will be demonstrated March 29 by Umbaugh Aircraft Corp., Ocala, Fla. Company says the new copter has vertical takeoff capability, climbs at 3,000 fpm, cruises at 100 mph and has three-hour range. Machine will be priced from $7,995 to $9,995.

High court tax ruling hits manufacturers

U.S. Supreme Court has ruled that manufacturers are subject to local personal property taxes even though the taxed materials or products may be defense items on which the federal government has made progress payments.

Court ruled in favor of states twice. First case involved, among others, Continental Motors Corp. and state of Michigan. Second was brought by American Motors Corp. and Defense Dept. against state of Wisconsin.

A similar case now is pending in the California state supreme court. It would allow Los Angeles County to keep money paid it under protest by aircraft manufacturing companies. If upheld, county will net about $55 million by the end of next year.

Douglas may get big order for C-133s

Douglas Aircraft Co. will get orders for about $100 million for the C-133 if Congress approves Air Force programs outlined in President Eisenhower's budget for fiscal 1959. Aircraft as modified will be used to transport big ballistic missiles.

The aircraft "buy" is considered insufficient to meet requirements for additional airlift for the Army. One congressman is suggesting that the Air Transport Division of the Air Force ought to be returned to the Army or that the Army ought to be allowed to buy its own airlift.

Air Force boosts J57 overhaul time

Airlines anticipating jet transport operations were on the receiving end of some good news affecting Boeing 707 and Douglas DC-8 powerplants.

Air Force has stretched the time between overhauls of Pratt & Whitney J57 engines from 800 to 1,000 hrs. P&W spokesmen point out that for an engine to reach the 1,000-hr. overhaul point in seven years is considered exceptional.

The J57 began with a 50-hr. limit when it was first used on the B-52; 250 hrs. in 1953; 500 in 1954, and 800 in 1956.

Exclusive: Roundup report on Army's VTOL testbeds

Fairchild Aircraft Div. is developing a vectored-slipstream VTOL (artist's concept above) under contract with Army Transportation, Research and Engineering Command, and expects to fly a testbed version by late summer or early fall.

The Fairchild design is one of five such projects being funded by Army, the other four being in a more advanced stage of development. They are:

Doak Aircraft's Model 16 ducted propeller VTOL which rolled out last month has hovered a few feet off the ground in tiedown tests.

Vertol Aircraft's Model 76 tilt-wing design has flown both horizontally as an airplane and vertically, is scheduled for transition flight before the end of this month.

Ryan Aeronautical's Vertiplane has been undergoing taxi tests and has flown horizontally.

Bell Aircraft's XV-3, following damage to first prototype, recently completed full-scale windtunnel testing at NACA Ames Aeronautical Laboratory and has since completed transition flight up to 20 degrees from vertical.

All five Army testbeds are slated to be turned over to NACA later this year or early in 1959 following completion of flight tests by manufacturers. NACA will fly each model an estimated 20 to 25 hours to evaluate flight behavior and also to attempt to arrive at a set of desirable flight characteristics for VTOL aircraft in general.

House upholds industry opposition, drastically amends Defense funding bill

An anxiously watched bill to trim large Pentagon carryover funds that aviation manufacturers consider vital has passed the House—but in a drastically amended form.

The little-understood, complex measure, as originally proposed by the Hoover Commission, would have limited defense expenditures to money appropriated in a single year by Congress. Unspent funds would have lapsed at the close of each fiscal year.

A majority of the House Appropriations Committee foresaw bookkeeping headaches, other complications. Led by Chairman George Mahon (D-Tex.) of the Military Appropriations Subcommittee, opponents heatedly denied the bill (H.R. 8002) would effect huge savings.

Joining these Congressional forces, segments of the aircraft industry bitterly opposed the measure. They argued that the carryover balances must remain intact to finance long lead-time weapons, such as missiles and aircraft developed over a period of several years.

The bill, as sent to the Senate, would not alter the basic method of appropriating funds.

It would:

Authorize House Appropriations committees to clamp a legal limit on the amount to be spent by an agency in any one year.

Require Defense and other government officials to justify backlog funds at the close of each fiscal year.

A softening amendment would allow the same committees to approve transfer of funds without being overruled on the floor.

The House bill, nevertheless, represented a defeat for fiscal leaders there. They opposed all hamstringing legislation. In debate, unusually bitter for a budget measure, the Hoover group was accused of selling a fraud to the public.

Senatorial sponsors of a similar reform measure last week were in accord with the House version. A debate was assured, but eventual passage is a virtual certainty. Senate legislative aides, privately, made no bones about their view of the watered-down bill. Nothing more than a "propaganda victory" for the Hoover forces, they said, as the measure neared a Senate showdown.

Success of Cessna T-37 reshapes USAF training

Cessna's T-37A twin-jet primary trainer, which has been undergoing Phase VIII testing, made the grade with flying colors this month along with USAF Air Training Command's first class of T-37A students.

The jet training experiment conducted at the civilian contract school operated by Southern Airways, Inc. at Bainbridge, Ga. (AMERICAN AVIATION, Aug. 12, 1957, p. 69) has dictated future AF training policy.

Training Command plans to give students 30 hours in the Beech T-34, 130 in the T-37A and about 160 in Northrop's T-38 supersonic jet trainer. The T-38 is expected to be in service by late 1959.

Maximum speed ever attained by the T-37A is Mach .78 (593 mph); however, ATC's red-line is Mach .65 (494 mph). Orders for the T-37 now total 670.

Quesada clarifies role of ACC Nav-Panel

Respective roles of the Nav-Panel of the Air Coordinating Committee and the new Airways Modernization Board were made abundantly clear recently when Presidential Assistant Elwood R. Quesada revised Nav-Panel's terms of reference.

Expected controversy over conflicting functions of the ACC group, AMB and Air Navigation Development Board (AMERICAN AVIATION, Jan. 13, p. 55) didn't get off the ground. ANDB was abolished and was absorbed into AMB. Next he personally deleted all reference to functional requirement, implementation and evaluation of the Common System from Nav-Panel's terms of reference. Any firm agreements between ACC and ANDB were cancelled with the demise of the latter.

This leaves with Nav-Panel the responsibility of review and coordination of plans, programs and policies relating to the so-called common system, as well as review and coordination of standards, rules and procedures relating to air traffic control.

Quesada's appointment to chairmanship of ACC, which parallels his post at AMB, should effectively resolve any matters of conflict that might arise between the two agencies.

Navy irons out bugs in Temco trainer

Navy Bureau of Aeronautics is now ironing out three major "bugs" in Temco Aircraft's TT-1 Pinto following completion of preliminary evaluation of the jet trainer at Patuxent (Md.) Naval Air Station.

TT-1 recently underwent extensive testing by BuAer test pilots to determine what changes will be necessary before it enters formal trials sometime this month.

Complaints about the plane's stall characteristics and marginal engine power were mingled in the report with tributes to its good points. Pilots were generally impressed, Navy says, with the Pinto's excellent cockpit layout and the "excellent student-instructor visibility."

Concerning stall characteristics, Navy noted that TT-1's natural aerodynamic stall warning margin and intensity, although satisfactory for experienced pilots, is considered inadequate for students. Post-stall characteristics, however, were classed as excellent.

A BuAer spokesman said that an artificial stall warning device "such as a rudder shaker" is planned for the plane, probably actuated by an angle-of-attack sensing system. However, no firm decision has been made as to what type it will be or if it will actually be installed. Final decision will depend on results of next stage of the evaluation.

The TT-1's present Continental J69-T-2 engine, rated at 920 lbs. thrust, is considered to have "marginal excess thrust" for wave-off in landing configuration.

There is some indication that the engine is otherwise satisfactory, since BuAer is investigating the availability of Continental's YJ69-T-25 engine (1,020 lbs. thrust). Retrofit to the newer engine is under consideration, if and when a 150-hr.-qualified engine becomes available. Presumably the new engine will undergo tests in the upcoming formal trials.

Only one other major complaint was listed. The report said that the main wheel brakes were "troublesome" during the tests. Temco and Goodrich are cooperating in an effort to develop more reliable and effective brakes for the trials.

Formal trials, conducted by Navy's Board of Inspection Survey, were scheduled to begin at Patuxent at presstime, with delivery to Training Command at Pensacola, Fla. of production models planned for mid-summer.

Wilson, Tunner move up in top-level AF changes

Two major changes in top Air Force command are imminent with retirement of Lt. Gens. Donald L. Putt and Joseph C. Smith.

WILSON

TUNNER

Lt. Gen. Roscoe C. (Bem) Wilson will succeed Putt as Deputy Chief of Staff (Development) and Lt. Gen. William H. Tunner of Berlin airlift fame will take over Smith's post as commander of Military Air Transport Services.

Wilson now is AF member of the Weapon System Evaluation Group in the Office of Assistant Secretary of Defense (R&D). His previous assignments include: chief of the Military Assistance Advisory Group for United Kingdom, commandant of the Air War College and Assistant Deputy Chief of Staff (Operations) for atomic energy.

Tunner is now Deputy Chief of Staff (Operations). He previously has been commander-in-chief of USAFE and deputy commander of MATS.

Disposal group to handle machine-tool surplus

Defense Mobilizer Gordon Gray has named a permanent committee to develop a disposal technique to handle surplus production equipment and machine tools which will not disrupt the sensitive metalworking and production equipment industries. Disposal is planned because of government belief that forces-in-being, not industrial potential, will decide a future war.

Government agencies represented on the committee are General Services Administration, Business and Defense Services Administration, Defense Department and Small Business Administration, in addition to Office of Defense Mobilization.

BRIEFS

Manufacturing-military

Hayden Aircraft Corp. has an agreement with Aircraft Hydro-Forming, Inc., Gardena, Calif., parts manufacturer, under which latter will manufacture the Stout Bushmaster (Ford Trimotor). Three aircraft will be produced by Thanksgiving.

Grumman Aircraft has announced it will enter the VTOL field and will produce hardware at the "earliest possible time." F. T. Kurt, former quality control director, has been named VTOL coordinator.

Expenditures for military aircraft totaled $4,219,018,000 during the six months ended Dec. 31, Defense Dept.'s monthly budget report reveals. Figures do not include additional expenditures for military assistance programs.

Curtiss-Wright Corp. has consolidated sales and services responsibilities in the United States for Canadian Curtiss-Wright, Ltd., formerly Isotope Products, Ltd., with those of C-W Electronics Division at Carlstadt, N.J.

Air Materiel Command has awarded contracts totaling more than $25 million: Sikorsky Aircraft Div. of United Aircraft Corp., $16,000,800 for H-37A helicopters; Ryan Aeronautical Co., $1,387,293 for Q-2 Firebee drones; Continental Aviation & Engineering Co. $8,352,272 for J69 engines for T-37 trainers and Firebee drones.

Laboratory for Electronics has received a $3.6 million contract for engineering and manufacture of portable landing control central systems (precision approach radar, PAR). Award was made by Rome (N.Y.) Air Force Depot, AMC.

Cessna Model 175 is quiet, efficient

CESSNA'S new Model 175 features one major engineering change and several airframe refinements. Major departure is use of a geared engine turning an oversize prop. The 175-hp Continental GO-300A engine is geared at a ratio of .75 to 1, turning an 84-inch McCauley prop 2,400 rpm for 3,200 engine rpm at maximum power. This is said to result in higher performance with a lower noise level. The engine cowl has been redesigned and the air intake is positioned high on nose to avoid entry of dust. Cruise speed is 139 mph at 10,000 feet at 70% of power. Range is about 595 mph. Price: $10,995 f.a.f. Wichita. Speed fairings on wheels are optional.

American Aviation Announces the

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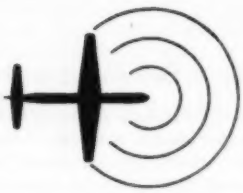

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UNITED AIR LINES

When and Where

APRIL

Air Traffic Conference, spring meeting, Hotel Statler, Washington, D.C., April 8-10.

SAE national aeronautic meeting, Hotel Commodore, New York, April 8-11.

Aeronautical Training Society annual meeting, Mayflower Hotel, Washington, D.C., April 10-11.

Assn. of Local & Territorial Airlines, quarterly regional meeting, Las Vegas, April 10-11.

Federation Aeronautique Internationale, Los Angeles, April 14-16.

American Helicopter Society, annual national forum, Sheraton-Park Hotel, Washington, D.C., April 16-19.

International Airline Navigators Council, annual convention, Piccadilly Hotel, New York, April 22-24.

Flying Physicians Assn., spring cruise, Valley Ho Hotel, Scotsdale, Ariz., April 24-27.

MAY

National Flight Test Instrumentation Symposium, Instrument Society of America, Park Sheraton Hotel, New York, May 4-7.

American Assn. of Airport Executives, annual business meeting and convention, Hacienda Motel, Fresno, Calif., May 4-7.

Annual Miami-Havana Air Cruise, sponsored by Florida Air Pilots' Assn. (For details contact: J. G. Pace, 310 S.E. 2nd Ave., Miami, Fla.) May 10-13.

IRE national conference on aeronautical electronics, Biltmore Hotel, Dayton, O., May 12-14.

Airport Operators Council, annual meeting, San Juan, Puerto Rico, May 12-16.

National Fire Protection Assn., annual aviation fire safety seminar, Palmer House, Chicago, May 19-23.

Aircraft Industries Assn., board of governors meeting, Williamsburg, Va., May 21-23.

Aviation Writers Assn., annual convention, Shamrock Hilton Hotel, Houston, Tex., May 25-31.

BOOKS

Aircraft Hydraulics. *Edited by H. G. Conway. Two volumes, Hydraulic Systems and Component Design. Published by The Macmillan Co., New York. 146 pp. and 198 pp. Price, $7 and $9, respectively.*

Hydraulics experts contributed the chapters of these volumes. Chapters cover such topics as fluids; theory of hydraulics; performance problems of pipes and components; systems; circuits; installation and operation; seals; pumps and motors; jacks; selectors; valves; miscellaneous components; servo controls and pipe work.

The Ford Story, *a Pictorial Story of the Ford Tri-Motor, 1927-1957. By William T. Larkins. Published by The Robert R. Longo Co., Inc., Wichita. 178 pp. Price, $4.95, standard edition; $7.95, de luxe edition.*

A complete history of all Ford airplanes. Includes photographs, scale drawings.

SPOTLIGHT

Lockheed is talking to European airlines about a supersonic jet for delivery in six to seven years. Company has redirected its main Electra turboprop sales effort from European airlines to U.S. Air Force.

Air Force and Dage Television Div. of Thompson Products are experimenting with a Dage-designed ground-to-air television system that would give pilots a pictorial display of ground conditions while still 100 miles away from the landing area. System employs a miniature 14-lb. transistorized receiver. Weather information, including maps, also could be transmitted.

Pan American World Airways plans to take an "NX" Boeing 707 to Europe next August and be ready to start transatlantic service by Nov. 1.

Sikorsky S-62 turboshaft helicopter is scheduled to make its first flight in May. It will be powered by a single General Electric T58 turbine and will have water-tight hull for water landings.

Boeing Airplane Co. has several 707-150s (a derivative of the −120 with P&W J57s) available for delivery in May 1959.

McDonnell Aircraft is developing its own version of an aerial jeep. Design will incorporate rotor system borrowed from company's XV-1 experimental VTOL aircraft which has completed its evaluation program.

Canadair's first CL-66 Napier Eland-powered turboprop version of the Convair 440 is scheduled to fly late in summer, with first deliveries to RCAF before year's end.

Lockheed-Marietta has drawing board design of a small version of the C-130 Hercules turboprop to meet an Army general operating requirement for a logistic support aircraft that eventually will replace the de Havilland (Canada) DHC-4 Caribou.

Latest Douglas version of the DC-9 has two J75s rated at 18,000 lbs. thrust each—an indication Pratt & Whitney has uprated the engine. DC-9 will feature carry-on baggage provisions.

Ryan Aeronautical has completed its 100th 40-ft. aft fuselage section for the Boeing KC-135. Sections reportedly are largest ever subcontracted. Company says schedules are being met or exceeded. Ryan built 875 aft fuselages for the Boeing KC-97 program.

Convair has a 105,000-lb. scaled-down version of the 880 using two General Electric X220 turbofans, but this is just a paper project at this point. Company is offering the 880 to American with four X220s.

Development of the Fairchild J83 and General Electric J85 turbojets constituted a major breakthrough for development of real VTOL/STOL capability. Improved thrust-weight ratio of these engines will permit any aircraft builder or designer to come up with a good VTOL, informed sources say. While AF has a general operational requirement for such an aircraft, no money is now available to buy. Best that can be offered are R&D funds.

Cessna plans to come out with a two-place replacement for its popular 140-series before year's end. It will be a high-wing, tricycle gear, all-metal, high-performance aircraft that will cruise 125-135 mph. Pricetag will be about $7,000. The 140 was discontinued in 1950.

Northrop's N-156F fighter, which is being tailored to short fields of NATO countries, will be capable of takeoff from mobile zero-length launchers. Windtunnel development on leading-edge slats and boundary layer trailing-edge flaps of new fighter is under way.

Convair-Ft. Worth is modifying four Air Force Douglas C-54s to air-sea rescue configurations. Conversion includes reworking cockpit, relocation of instruments and bubble-type scanners for search missions.

How B. F. Goodrich aviation products help Flying Tigers give "Super" service

Backbone of the Flying Tiger Line's air freight operation both here and abroad is a fleet of 12 Lockheed Super H Constellations. To keep these big planes on schedule, and to help them give really "Super" service, Flying Tiger depends on a wide variety of B. F. Goodrich aviation products.

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MARCH 24, 1958—VOL. 21, NO. 22

AMERICAN AVIATION

WORLD'S LARGEST AVIATION PUBLISHERS

$6.5-billion question . . .

How to dispose of 50 million sq. ft. of plant space without disrupting the economy; no answers in sight

by Elizabeth Oswald

THE BIGGEST quiz game in history is being played at the Pentagon. Stakes are Army, Navy and Air Force plants built to meet military requirements for conventional weapons, including aircraft, engines and propellers and to handle future mobilization requirements. Cost of plants may total $6.5 billion.

The question is simple. "What shall be done with the plants—some wholly owned by the Government—some partially owned—which are no longer needed to support current military requirements?"

Trouble is that no one knows what the winning answer is. There are almost as many answers as there are plants. Those that wrestle with the problem of these plants are sure only of one thing—many must be disposed of.

But even with this knowledge, the question which keeps responsible Pentagon officials up nights is: "How may these plants be disposed of with a minimum disruption to the economy?" And collaterally, "What happens to the companies and personnel who have built up skills and know-how and who have over the years done all or almost all of their business with the Federal Government?"

Baker sounds warnings

The first warnings on the dangers of "overfacilitization" were sounded by Maj. Gen. David H. Baker, then director of procurement and production at the Air Materiel Command, and now president of Capital Airlines. Gen. Baker urged the aircraft manufacturers to begin to dispose of their older plants, warning that otherwise "an increasing share of taxpayer's money" would be going into nonproductive overhead. This, in turn, would cut down on the availability of funds for badly needed new production.

Later Gen. Baker spelled out the meaning of overfacilitization. He warned last spring that 40 million sq. ft. of space, then devoted to testing and production of air weapons, would be slashed to 20 million sq. ft. by 1959, leaving the industry with some 50 million sq. ft. of excess capacity. This figure, he predicted, could not be improved either by the withdrawal of government-owned facilities frequently more modern than company-owned plants or by conversion to missile production because of new manufacturing conditions required.

No real answers yet

However, despite definition of the problem almost 18 months ago, there aren't any real answers yet. And since the warning of overfacilitization the manufacturing space headache has grown worse because of the change in mobilization policy—indicating little or no reliance on the industrial potential after the start of war. Planners now think the wars of the future will be fought for the most part with weapons in being.

This seemingly means that carefully and sometimes painfully built-up facility packages must be torn down. But, ask the planners: "How?"

What are these plants? How many engine plants are needed? What should be done with the reciprocating engine plants? What ought to be done with the propeller plants? One company—Hamilton Standard Propeller has seemingly come up with an answer—diversification. And others have tried with varying degrees of success.

But what of the others? For some the answer will be mergers. In a few cases, shotgun weddings are expected with one or another of the services holding the shotgun when operating contracts for facilities expire. In those cases, it can be expected that the company will be told—if it wants a renewal of its contract—to find another company with which to merge. A company that will supply needed complementary strength will be sought. An example of this type of action was the joint agreement by North American Aviation and Phillips Petroleum Co. to set up Astrodyne, Inc. to operate the Air Force Plant 66 at MacGregor, Tex.

Still other facilities will be closed and the equipment, where usable, moved to other plants. An example is the Air Force-owned facility in Chicago which has been operated by Ford Motor Co. for the manufacture of J57 and J75 engines. Here, the plan is to move whatever machine tools and production equipment can be used by other companies out of the plant and to close and perhaps ultimately sell the remaining plant and equipment.

But these decisions, whether to close a plant completely, or to consolidate production now going forward in two plants, have serious economic repercussions of which both responsible military and civilian officials are fully aware. These economic repercussions are what keep these officials up nights and for which they can find no answers.

Unemployment feared

All of the alternatives look equally bad. Keeping a plant going at an uneconomic rate of production makes the cost of defense astronomical and probably prohibitive. Closing the plant creates more unemployment, something which must be avoided wherever possible.

As a result, for the foreseeable future at least, each case will be handled on a separate basis—with all of the alternatives explored before decision, and probably no pattern for the handling of these problems emerging even though, as one high ranking military officer put it: "You force me to say that we are not in the unemployment insurance business."

At ALPA safety forum

Pilots grope into a hazy future

by George V. Hart

CHICAGO—Efforts by pilots to prepare themselves for upcoming jet transport operation were marred by a personal lack of all-important background information at the Air Line Pilots Assn. sixth annual air safety forum here this month.

Although speakers at the forum provoked *some* response among pilots, lethargy displaced lively discussion in what will probably be the last ALPA safety forum before introduction of the new jets.

Why? The majority of ALPA members present (attendance numbered about 200) apparently had not acquainted themselves with the problems lying ahead.

This appeared surprising in view of the voluminous jet data compiled by the U.S. Air Force, Britain's R.A.F. Transport Command and British Overseas Airways Corp. over a number of years. The results of their experience in scheduled turbine operations over a wide range of conditions are a matter of record, but apparently a record not sought by pilots in preparation for the conference.

The session did, however, highlight these points of controversy:

Pilots charged that Civil Air Regulations governing airline training programs are "minimums" and subject to loose interpretation. As an example, they noted that one carrier has a $5-million centralized training installation (obviously United Air Lines' at Denver) compared to "paper programs" in the case of some others.

E. R. Watson, Eastern Air Lines pilot and chairman of ALPA's training plan committee, made it clear the pilot union aims to monitor future training.

Tension of the long-standing dispute between ALPA and the Flight Engineers International Assn. was evident in training discussions. ALPA contended present training techniques are outmoded and do not provide a "fail-safe" crew. Its answer, particularly in jet operations: the flight engineer must be a qualified pilot.

Unexpected controversy was created by Dr. Charles I. Barron of Lockheed Aircraft Corp. Dr. Barron, president of the Airlines Medical Directors Assn., questioned whether a pilot who could not be exposed safely to controlled pressure-chamber exercises should be given command of a commercial aircraft carrying more than 100 passengers.

Capital Airlines' captain J. R. McDonald immediately took issue with this remark which he interpreted as a suggestion that special medical certificates be required for pilots of jet transports.

J. L. DeCelles, TWA captain, indicated that he did not care to assume the role of a guinea pig to prove to himself the effects of lack of oxygen and loss of pressure. He questioned the advantages of experiencing these conditions and implied that he would be happy to accept a verbal explanation.

Keenest interest in training matters during the forum was spurred by Col. Kenneth Rea of USAF's Strategic Air Command. Col. Rea related to pilots the know-how gained by SAC in converting from KC-97 tankers to KC-135 jets.

SAC's transition program allows six weeks of ground school including four simulator training "flights." This is followed by a five weeks course involving four more simulator exercises and 45 to 50 hours of actual flight time.

Inadequacy of existing airports is the most serious obstacle to orderly expansion of commercial aviation, Capital pilot J. D. Smith told a session on positive traffic separation and airspace utilization.

Surprisingly, Smith charged, present traffic control capacity surpasses any airport capability in the U.S.

Pilots listed these factors among major items essential to airport improvement:

Intelligent runway planning must permit simultaneous instrument approaches.

Installation of improved visual aids must be expanded to more airports.

Traffic control equipment must allow mingling of jet and piston aircraft with no reduction in landing rate.

It must be possible to feed jets into the final landing operation from at least 20,000 feet.

Runways should be designed to permit high-speed turn-off of varying types of aircraft.

It is senseless, Smith implied, to pour millions of dollars into expansion of passenger handling facilities without first increasing airport operational capability.

Why, asked pilots, should airports accepting federal aid be immune from government regulations establishing operational standards?

Other major deficiencies concern communications and inadequate airborne equipment, according to Capital's J. D. Smith.

Lack of communication and coordination in air traffic control still is hampering operations, he charged, blaming overtaxed controllers and absence of modern equipment for delays in revision of flight plans, clearance to alternates, forwarding of flight plans to en route stations, etc.

Increase in controller workload and consequent reduction in airspace utilization results from use of both LF and VHF navigation systems, Smith says, stating that inadequate radio frequencies with resultant overlapping between higher-density areas create difficult problems for all concerned.

Pilots received little consolation from Presidential aide E. R. Quesada, who told the forum that equipment being developed for Airways Modernization Board will not be in general use for some years.

Most explosive open session was only distantly related to safety.

Pilots attacked CAA and CAB enforcement policies on the grounds that pilot judgment is impaired by fear of violation. Regulations, they feel, do not permit sufficient latitude of interpretation.

Somebody's wrong but who?

There's only one thing clear about the situation with respect to CAA status on qualified air traffic control personnel — somebody's wrong.

The confusing participants: CAA and the Department of Commerce.

In response to a recent request by Air Traffic Control Assn. that controllers be granted pay benefits awarded scientists and engineers, Asst. Secretary of Commerce George T. Moore supplied two pages of statistics to show that there is no shortage—and no need for emergency action.

At the same time, CAA was issuing instructions to field offices noting the series shortage of qualified controllers and authorizing extensive overtime to cope with the situation. Some ARTC centers reportedly are now short as much as 50% in the qualified controller category.

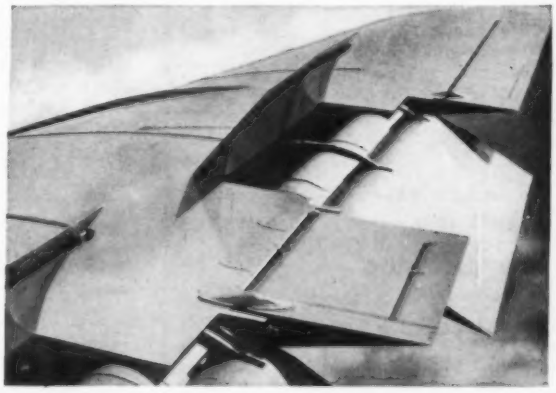
ATCA contends, and apparently with justification, that higher pay scales not only will help hold present qualified controllers, but will enable CAA to employ higher-calibre personnel and shorten the time for training new people it hires.

REPORT ON TRAFFIC PATTERN AND GROUND HANDLING

THE PRODUCTION BOEING 707, as demonstrated by 3½ years of test-flying of the prototype model, operates with ease in existing traffic patterns of commercial airports. Though it cruises at 600 mph, the Boeing jetliner's maneuvering speeds and airspace requirements for holding and instrument approaches are the same as those of today's conventional airliners.

GROUND-HANDLING poses no problems. For ground-handling and taxi characteristics of the 707—and of its shorter-range sister ship, the 720—are equal to and, in some cases, better than those of present-day commercial transports.

MANUALLY OPERATED flight control systems, proved out in hundreds of Boeing jet aircraft, give outstanding control and small airplane "feel" throughout all flight conditions. In rate of descent, the 707 and 720 offer greater flexibility than present airliners.



SPOILERS ACT AS AIRBRAKES, give added control over rate of descent. In all areas of operation, the Boeing 707 and 720 benefit from the unequalled experience Boeing gained building more than 1600 large, multi-engine jet aircraft.

BOEING

Family of jet airliners

These airlines already have ordered models of the Boeing family of jetliners:

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Accessory report . . .

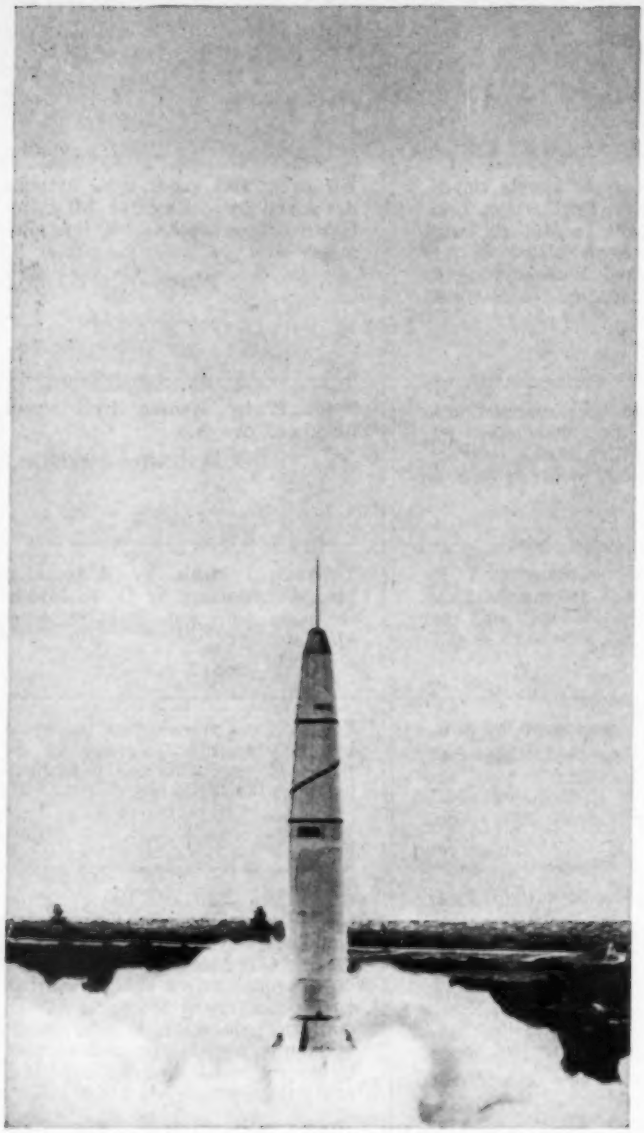
SYSTEMS	BOEING 707 Number on order: 162 First flight: Dec. 20, 1957	CONVAIR 880 Number on order: 63 First flight: Due Nov. 1958
Air conditioning	Air cycle system developed by AiResearch Mfg. Co.; Freon system not in basic airplane. Heat exchanger by AiResearch Mfg. Co. Cabin airflow capacity approx. 3,200 cfm.	Vapor cycle system developed by Hamilton Standard, Div. of United Aircraft Corp., using Hamilton Standard freon system; Stewart Warner Corp. heat exchanger; cabin airflow capacity 160 lbs./min. at sea level.
Controls—pedestal	Boeing designed drum system produced by Iron Fireman Mfg. Co.	Convair design.
De-icing—wings & tail	Wing—thermal; tail—electric; Goodyear Tire & Rubber Co., Inc. boots; United Control Corp. controls.	Wings—thermal; tail—electric; produced by B. F. Goodrich Co. & Canadian Applied Research Ltd.
De-icing—windshield	Thermal; controls by United Control Corp.; windshield by Libbey-Owens-Ford Glass Co. and Pittsburgh Plate Glass Co.	Electric; major components by Vapor Heating Corp. and United Control Corp.
Electrical	AC system, 115 v, 400 cycle; dc system, 28 v; generators by Westinghouse Electric Corp. Model No. 8QL40X; generator drive by Sundstrand Aviation Div.; circuit-breakers by Jack & Heintz, Inc.; dc power system (rating), 200 amp; transformer rectifier by General Electric Co. and Chatham Electric Corp.; voltage regulator by Westinghouse Electric Corp.; lead acid batteries by Exide Industrial Div., The Electric Storage Battery Co.	AC system, 160 kva/115/200 v; generators produced by General Electric Co., Model No. ZCM211A1; generator drive: C.S.D. by General Electric Co.; circuit breakers by Spencer Thermostat Div., Type D7271. DC system, 200 amp., 28 v; transformer rectifier by Chatham Electronics Div. of Gera Corp., 28 vs 50; batteries, Nickel-Cadmium 24 v, 13½ amp. hours. Manufacturer not yet determined.
Fire detection	Continuous cable type; engine detectors, cargo/accessory compartments by Walter Kidde & Co., Inc.	Continuous wire, single-loop ac system by Fenwal, Inc. To be mounted in engines or pylons.
Fire extinguisher	CB_2Fr; has system capacity of 2 cylinders each containing 2.5 lbs., located at inboard strut. System by Walter Kidde & Co., Inc.	Bromotrifluoromethane; 4 bottles each containing 6.5 lbs.; located in pylon. Manufacturer not yet chosen.
Fuel	Operating pressure, 16 psi maximum; 4 P & W pumps supplied on engine; 10 booster pumps by Thompson Products, Inc.; bladder cells by Firestone Tire & Rubber Co.	Operating pressure 60 lbs. (rated); 8 engine pumps and 8 auxiliary pumps used in system, both types manufactured by Thompson Products, Inc.; 12 selector valves by William R. Whittaker Co., Ltd.

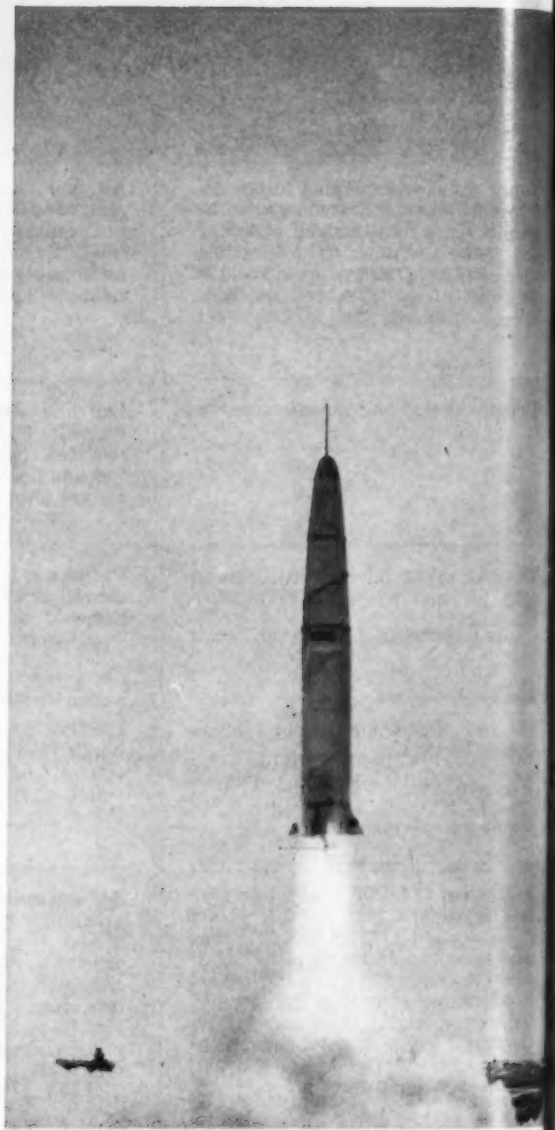
. . . U.S. turbine transports

DOUGLAS DC-8	FAIRCHILD F-27	LOCKHEED ELECTRA
Number on order: 138 First flight: Due April 1958	Number on order: 66 First flight: Late March 1958	Number on order: 144 First flight: Dec. 7, 1957
Vapor cycle system using turbos developed by Douglas, freon system by Carrier Corp.; AiResearch Mfg. Co. and Stewart Warner Corp. heat exchanger; cabin airflow capacity 234 lbs./min. at sea level, 166 lbs./min. at cruise altitude.	Air and vapor cycle system developed by Godfry Engineering Co., Ltd. using Stratos (a Div. of Fairchild Engine & Airplane Corp.) freon system and heat exchanger; cabin airflow capacity 70 lbs./min.	Air cycle and vapor cycle systems developed by AiResearch Mfg. Co. Cabin airflow capacity 140 lbs./min. at sea level.
Douglas design and manufacture.	Fairchild design and manufacture. Propeller flight "fine pitch" stops are removed, permitting blades to enter "ground fine pitch" by lifting throttle control levers.	Produced by Hansen Lynn from Lockheed design.
Thermal; cyclic valves by AiResearch Mfg. Co. and William R. Whittaker Co., Ltd.	Pneumatic boots; produced by B. F. Goodrich Co. and Bendix Aviation Corp.	Thermal; controls by AiResearch Mfg. Co., ducting by D. K. Manufacturing Co. and Stainless Steel Mfg. Co.
Thermal; Nesa windshield by Libbey-Owens-Ford.	Electric; major components by Pittsburgh Plate Glass Co.	Electric; uses transformer by Acme Electric Heating Co.; control by Barber-Colman Co. and windshield by Libbey-Owens-Ford.
AC system 115/200 v; generators by Jack & Heintz, Inc., Models 31008 (20 Kva) and 31425 (30 Kva); constant speed generator drive by Sundstrand Aviation Div.; circuit breakers by Mechanical Products, Inc. dc system, 28 v; transformer rectifier by General Electric Co.; voltage regulator by Jack & Heintz, Inc.; nickel-cadmium batteries by Sonotone Corp.	AC system, 115 v, dc system, 28 v; generators by Jack & Heintz, Inc., Model No. F20-4, F35-5, 629-T; generator drive by Rotol Limited; circuit breakers by Mechanical Products, Inc.; voltage regulator, Model No. 66-34-2 by Jack & Heintz Inc.; nickel-cadmium batteries by Sonotone Corp.	AC system, 240 kva/400 cycle; dc power system 28 v (transformers and rectifiers); generators by General Electric Co., Model No. 2CM210A1; direct engine driven generator drive; circuit breakers by Mechanical Products, Inc.; dc power system rating: 300 amp; transformer and rectifier by Westinghouse Electric Corp.; lead acid batteries type AN 3150.
Continuous cable type by Walter Kidde & Co., Inc.; engine detectors and cargo/accessory compartments by Walter Kidde & Co., Inc.	Continuous cable; engine detector, accessory compartments by Thomas A. Edison Industries.	Continuous cable; engine detectors by Walter Kidde & Co., Inc.
Bromotrifluoromethane, containing 8.4 lbs. per bottle; system capacity: 2 in each wing, located between pylons. Entire system by Walter Kidde & Co. Inc.	Four bottles each containing 14 lbs. produced by Fenwal, Inc. and located in engine. Three portable bottles by Walter Kidde & Co., Inc. located in passenger compartment.	Bromotrifluoromethane by Walter Kidde & Co., Inc.; system capacity: 4 x 10.9 lb.—containers located in engine nacelles. Entire system by Walter Kidde & Co., Inc.
Four Nash engine pumps operate at 50 psi (with auxiliary pump on); auxiliary pumps operate at 20 psi, manufactured by Pesco Products Div.; selector valves by Gladden Aircraft Products Corp.	Operating pressure, 10-12 psi; engine pumps are an integral part of fuel control which is manufactured by Rolls-Royce Ltd.; 2 Pesco Products Div. auxiliary pumps per engine.	Operating pressure: 18 psi; engine pumps (4) by Pesco Products Div.; auxiliary scavenger pumps (4) by Thompson Products, Inc.; selector valves (13) by General Products Co.

(Continued on pages 28-29)

Today's air power in action:*





Thor starting one of its highly successful test flights from Cape Canaveral, Florida

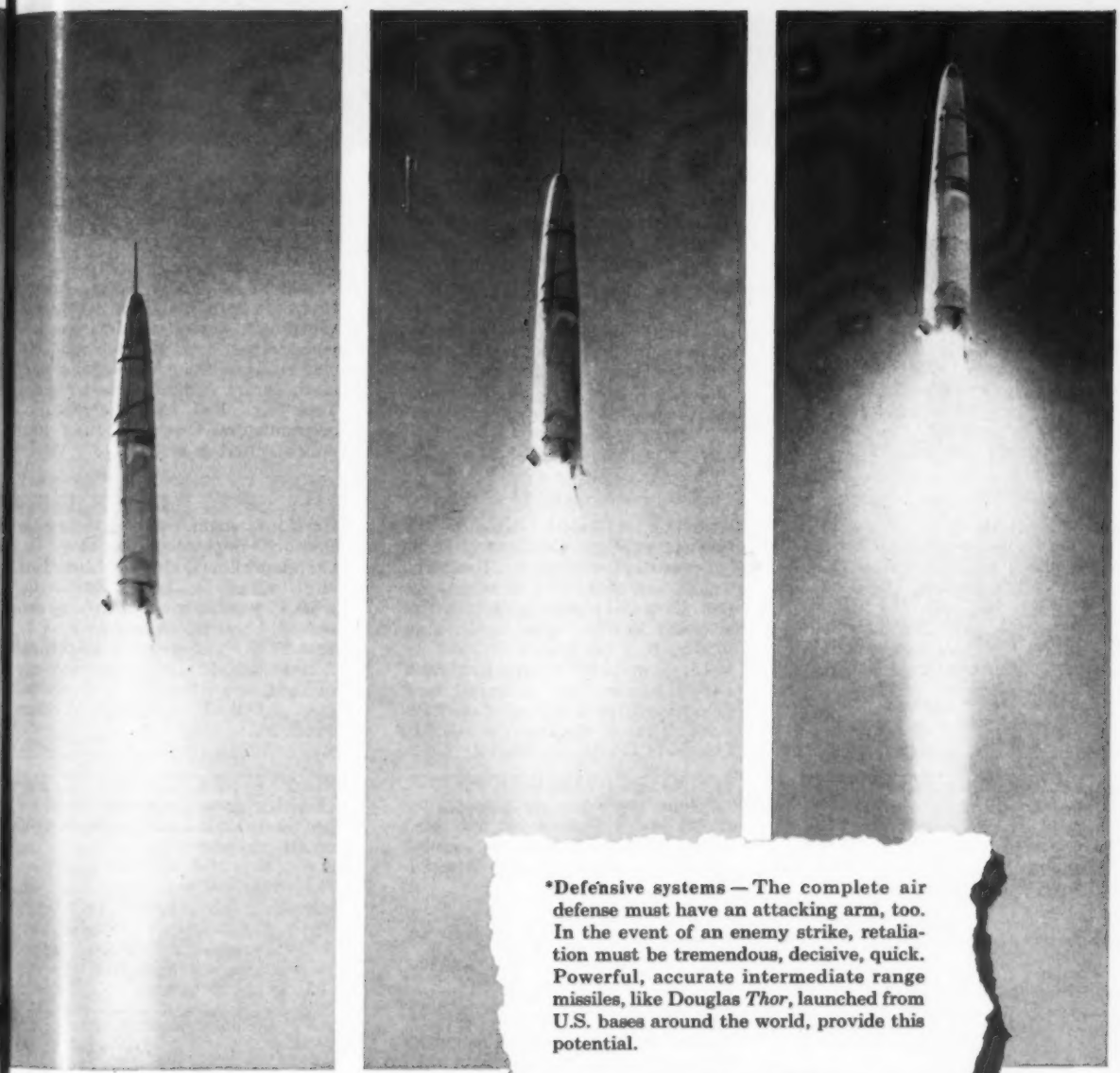
Giant Air Force THOR — *already in mass production* st

Last November 27th the Defense Department announced that the Douglas *Thor* had been ordered into production as the Air Force's intermediate range ballistics missile.

America's defense is gaining more than just a highly successful missile. *Thor* comes completely equipped with a Douglas-engineered support system that is *immediately* ready for field operation.

No hand-tooled prototype, the *Thor* test ,launc models fired for Air Force acceptance are built Such t with mass production tooling. As a result, ere 19, manufacture of *Thor* on a volume basis began oduced the minute Air Force approval was given y U.S

At the same time the science-industry- ssiles s military team which cooperated in developing -to-sur *Thor* readied the important systems required face. to make it operational... transportation, fuel- ssile ex



*Defensive systems — The complete air defense must have an attacking arm, too. In the event of an enemy strike, retaliation must be tremendous, decisive, quick. Powerful, accurate intermediate range missiles, like Douglas *Thor*, launched from U.S. bases around the world, provide this potential.

n strike anywhere in the world from U.S. bases !

, launc ing, training and parts replacement. Such t oroughness is typical of Douglas ere 19,)00 missiles of all types have been duced since 1941. In fact, Douglas is the y U.S manufacturer to have developed siles s stems in all categories...air-to-air, -to-sur ace, surface-to-air, and surface-to-face. A nd Douglas has an accumulation of sile ex perience unequaled in the U.S.

Depend on

DOUGLAS

First in Missiles

Accessory report — 2 .

SYSTEMS	BOEING 707	CONVAIR 880
Heating	Turbo-Compressor heated air source (3) by AiResearch Mfg. Co.; temperature control system by United Control Corp.	Two units by Cole Electric with 100,000 Btu capacity; Hamilton Standard temperature control system.
Hydraulic	Operates landing gear, flaps, spoilers, brakes, nose-gear steering; operates on system pressure of 3,000 psi; pumps (2) by Vickers, Inc. and (1) New York Air Brake Co.; accumulators by Sprague Engineering Corp.	Actuation of landing gear, brakes, anti-skid, flaps, stabilizer screw jack adjustment, spoilers, fuel jettison pump system, on pressure of 3,000 psi; 4 Hamilton Standard pumps used; Parker Aircraft Co. and Redco Tool Div., Red Lion Cabinet Co., accumulators. Over 100 other components used in system.
Landing gear	Actuating cylinders designed by Boeing Airplane Co.; shock struts by Cleveland Pneumatic Tool Co.; wheels and brakes by Bendix Aviation Corp.; Hydro-Aire, Inc. hytrol anti-skid system; nose gear tires (2) by B. F. Goodrich Co. size 39 x 13; 8 main gear tires size 46 x 14; available tire manufacturers, Goodyear Tire & Rubber Co., Firestone Tire & Rubber Co., B. F. Goodrich Co., U. S. Rubber Co.	Actuating cylinders produced by Peacock Engineering & Mfg. Co.; Cleveland Pneumatic Tool Co. shock struts; Goodyear Tire & Rubber Co. wheels & brakes; Hydro-Aire, Inc. anti-skid system; tire sizes: 29 x 7.7 and 39 x 13; eight main wheels and 2 nose wheels. Other available tire manufacturers include: U.S. Rubber Co. and B. F. Goodrich Aviation Products.
Oxygen	Gaseous; operates on pressure of 1,800 psi; cylinders (4) by Scott Aviation Corp. regulators, outlets, masks designed by Boeing Airplane Co.	Gaseous system operates on 1,800 psi; uses 3 cylinders giving a 113.5 cu./ft. supply.
Pneumatic	Engine starting components by AiResearch Mfg. Co.	None.
Pressurization	System maintains sea level cabin at 22,500 ft.; 7,000 ft. cabin at 40,000 ft. Cabin differential, 8.6 psi. Major valve and components, pressure regulator, control valve by AiResearch Mfg. Co.	Supercharger system . . . turbo compressors (2), each with a minimum capacity of 80 lbs. manufactured by Hamilton Standard. System performance: maintains 8,200 ft. cabin to 40,000 ft. Cabin differential—8.2 psi. Pressure regulator by AiResearch Mfg. Co.
Starter	Pneumatic; system by AiResearch Mfg. Co. Installed in aircraft.	Air turbine type by AiResearch Mfg. Co. installed in aircraft.

Note: All Boeing 707 system information relates to the Model 707-120 only.

U.S. turbine transports

DOUGLAS DC-8	FAIRCHILD F-27	LOCKHEED 188 ELECTRA
Uses heat of compression from cabin superchargers giving 400,000 Btu capacity; Barber-Colman Co. temperature control system.	Surface Combustion Corp. heaters giving 200,000 Btu capacity; Barber-Colman Co. temperature control system.	Heaters by AiResearch Mfg. Co. and Lockheed Aircraft Corp., temperature control system by AiResearch Mfg. Co.
Actuation of landing gear, flaps, ailerons, spoilers, rudder, horizontal stabilizer, brakes, on pressure of 3,000 psi; 2 pumps by Vickers, Inc.; accumulators by Bendix Products Div.; pressure regulator integral with pumps.	None.	Actuation of landing gear, brakes, servo controls, flaps, starter compressor, passenger stairs, windshield wipers, nose-gear steering operates on system pressure of 3,000 psi.; pumps (3) by Vickers, Inc. and one by Great Lakes Mfg. Corp.; accumulators by Sprague Engineering Co. and Parker Aircraft Co.; service center by Parker Aircraft Co.
Actuating cylinders (1 per gear) manufactured by Douglas; shock struts (1 per gear) by Cleveland Pneumatic Tool Co.; main and nose wheels and brakes by Bendix Products Div.; nose wheel tires (2) 34 x 11 Type VII; main gear tires (8) 44 x 16 Type VII. Available tire manufacturers: optional with airlines.	Actuating cylinders (6) by Walter Kidde & Co., Inc.; main and nose gear shock struts by Dowty Equipment, Ltd.; wheels & brakes by Goodyear Tire & Rubber Co.; Maxaret anti-skid system manufactured by Westinghouse Air Brake Co.; nose wheel tire size—8.50 x 10; main wheels (4) 9.50 x 16.	Actuating cylinders (2-NL6s and 1-NL6) and shock struts by Menasco Mfg. Co.; wheels and brakes by B. F. Goodrich Aviation Products; nose wheels (2) tire size 7.50 x 14; main wheels (4) tire size 13.50 x 16; available tire manufacturers; U.S. Rubber Co., Goodyear Tire & Rubber Co., B. F. Goodrich Co., Firestone Tire & Rubber Co.
Gaseous system; 1,800 psi bottle pressure; crew line pressure 150-50 psi; passenger line pressure: 100-10 psi; cylinders by Zep Aero, Scott Aviation Corp. and Walter Kidde & Co., Inc.; regulators by Scott Aviation, Alar Products, Inc. and National Welding Equipment Co.; outlets by Puritan Compressed Gas Co.; masks furnished by airlines.	For crew emergency only. Gaseous system, operates on pressure of 1,800 psi.; Aro Equipment Corp. supply cylinder used; 2 demand type; masks by Scott Aviation Corp.	System pressure 1,800 psi; gaseous system; 3-cylinders (2 portable) by Scott Aviation Corp. and Walter Kidde & Co., Inc.; regulators (1), outlets (89), masks all produced by Scott Aviation Corp.
Air starting manufactured by AiResearch Mfg. Co.	Operates landing gear, steering, wheel and propeller brakes, integral step door, emergency brakes and emergency landing gear extension. Major components by Fairchild Engine & Airplane Corp., Stratos Div. of Fairchild, Dunlop Tire & Rubber Co., Walter Kidde & Co., Inc., Westinghouse Air Brake Co., Dowty Equipment, Ltd.	Anti-icing, air starting manufactured by AiResearch Mfg. Co.
System performance: maintains 6,700 ft. cabin to 40,000 ft., cabin differential—8.77 psi. Pressure regulator by Kollsman Instrument Corp. Control valves by AiResearch Mfg. Co. and William R. Whittaker Co.	System performance: maintains 8,000 ft. cabin to 20,000 ft., cabin differential—4.16 psi; major valve and components, pressure regulator and control valve by Kollsman Instrument Corp.	System performance: maintains sea level cabin to 15,000 ft., 8,000 ft. cabin to 30,000 ft. Cabin differential —6.55 psi. Major valve and components, pressure regulator and control valve manufactured by AiResearch Mfg. Co.
Four air starters by AiResearch Mfg. Co. installed in aircraft; 1 combustor unit optional.	Electric; Model C-5104 by Rotax, Ltd. installed in aircraft.	Pneumatic type by AiResearch Mfg. Co. installed in aircraft.

Feats of Hercules, No. **2**

New missile muscle now for NATO bases!

The mighty Lockheed C-130 HERCULES can transport 90% of all types of missiles now operational with, and under development for, the U.S. Armed Forces. The HERCULES will fly missile cargoes non-stop for distances over 3400 nautical miles, at cruise speeds of 305 knots.

The rugged "go anywhere, haul anything" capabilities of America's first prop-jet combat cargo carrier add new strength to NATO supply lines —at a time when these far-flung bases are more vital to the free world than ever before.

In addition to "beefing up" the global mobility of the Armed Forces, the HERCULES is making new friends for the United States by its prodigious feats. Example: a C-130 of the 322nd Air Division, 317th Troop Carrier Wing, Evreux-Fauville Air Base, France, transported a 28,700-pound generator from Laon, France, to where it was badly needed to supply electric power in Adana, Turkey—and flew the 1981 nautical miles non-stop in less than seven hours.

Like all Lockheed designed and built aircraft, the C-130 HERCULES can be counted upon to do its assigned jobs with outstanding ability, no matter how difficult the task. That's why—

Lockheed

means leadership

Lockheed Aircraft Corporation
GEORGIA DIVISION, *Marietta, Georgia*

Accessories . . .

a $1.4-billion market

by William Beller

ONE OF THE MOST puzzling questions asked by close observers of the aircraft field is why prime contractors take such a patronizing attitude towards accessory manufacturers.

Do prime contractors scorn the youth of these suppliers, forgetting that as early as 1920 there were such things as turbo-supercharged Liberty engines? Do they regard the market as small despite its being equal in dollar volume to the basic engine market? Or perhaps they pity its isolation from the mainstream of aircraft design even though there might be better aircraft built if this were not true.

Here are some revealing statistics from a confidential survey made by a major producer of aircraft accessories:

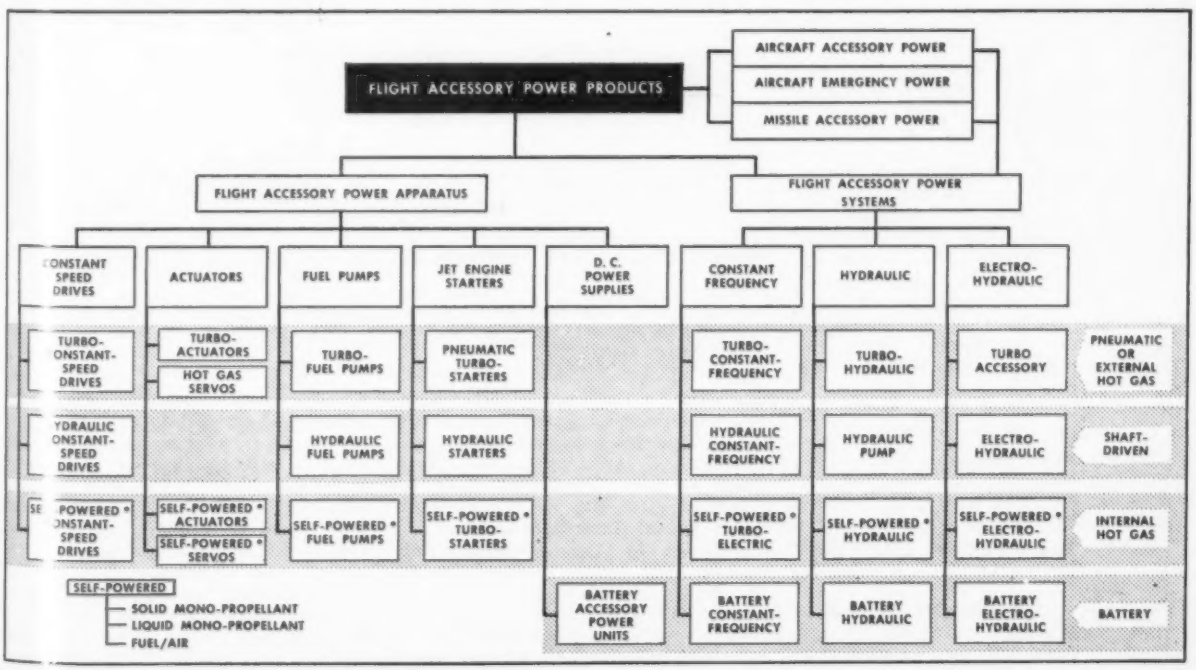
The market for aircraft and missile equipment averages over $1.4 billion per year. Propulsion accessories account for about half this figure. Airborne utility power accessories represent about one-quarter, conditioning about one-eighth.

This study points out that, compared to the military market, the commercial market for aircraft accessories is not large. Still, value of the 1965 market is said to be $210 million, a respectable sum. This same year the market for missile accessories shows a rise to $400 million, but even this value is admittedly on the low side.

From these figures, it is seen that companies making accessory-power products are in big business. Their manufacturers feel that the time is overdue for prime contractors to realize this fact, and to place accessory equipment and systems alongside airframe and propulsion systems as a major area of aviation design.

Meanwhile, the Bureau of Labor Statistics, as one example of a government agency looking backwards, persists in an archaic and abstruse presentation of aircraft data. As an instance, the agency groups production employes under four categories: *aircraft, aircraft engines & parts, propellers & parts,* and *other aircraft parts & equipment*. Why *propellers & parts* are assigned a major category when they account for less than 14% of the *other aircraft parts & equipment* employment figures is answered only by past year's doings.

Today's high-performance machines have two basic sources of accessory power: (1) The propulsion system including ram air, which is a propulsion by-product. (2) Self-contained sources, which include liquid or solid mono-propellants, and fuel plus air. There are less conventional sources such as solar and nuclear radiations,



SUGGESTED NOMENCLATURE for flight accessory power products. (Chart was devised by product information manager Paul Schraver to describe work of GE's aircraft accessory turbine department.)

but these are for the future.

Power sources in a high-performance aircraft must feed equipment producing electrical and hydraulic power, starting torque, linear or rotary actuation, fuel pumping activity and so forth. In addition, performance requirements call for rigid control of such items as electrical frequency, power output and weight together with resistance to high temperature, attitude changes and high G-loadings.

These requirements can result in a high degree of mechanical and electrical complexity. For this reason, the trend today is towards a systems approach. This means integrating component products into sub-systems in order to achieve greater simplicity and reliability.

It also means that there is a need for accessory systems management, according to W. C. O'Connell, general manager of General Electric's aircraft accessory turbine department, West Lynn, Mass. He calls for a single responsibility for combining and delivering suitable accessory power sub-systems to the weapons system contractor.

He points out that while the aviation industry is becoming more aware of the importance of its accessory power needs, the tendency still exists to ignore these needs until the flight vehicle is nearly developed. This places an extra burden on the suppliers of accessory power equipment because their development work is often as difficult as that in devising powerplants or guidance equipment. In the shock wave of this work is high financial risk.

Risky investment

The accessory power supplier is expected to invest large funds of his own to develop and produce new products. Yet the fluid nature of defense work, owing to state-of-the-art changes and new strategic decisions, makes investments in military hardware far riskier than similar ones in a market governed only by supply and demand.

On the other hand, the payoff for investing risk capital in this area is far less than that found in a similar commercial business. Contract prices are limited by the low profit rates of prime-system manufacturers having largely government-furnished facilities, and by the disallowance of costs necessary in normal business operation. Added to these problems are those of statutory renegotiation. The overall effect is to reduce capital available for investment in new developments.

Even after designing a new and useful product, the firm may not receive the production contract. It may go to another supplier for any of several reasons, and these do not have to relate to quality, price or production capability.

Based on these facts, O'Connell recommends the following actions for accessory manufacturers, weapons system managers, and the government:

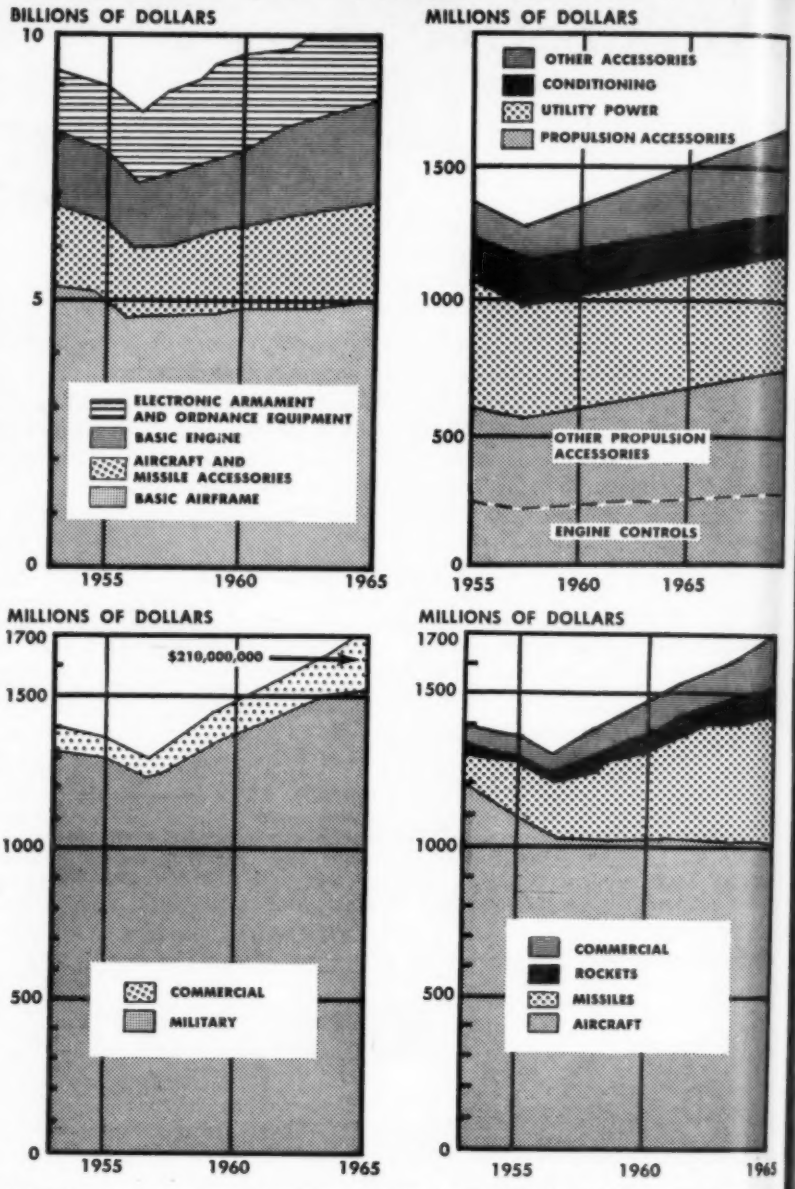
Action by flight-accessory power-equipment manufacturer. (1) Maximum technological development effort. (2) Control of costs; economical operation. (3) Judicious investment of capital in spite of financial risks. (4) Communication; that is, making capabilities known throughout industry.

Action by flight weapons-system manager. (1) Include accessory-power considerations at earliest stage of weapon design. (2) Contract for accessory sub-systems management. (3) In presenting weapons system to armed forces, recognize accessory-power development effort and contribution. (4) Give financial consideration to accessory supplier's facility investment.

Action by government. (1) Encourage industry to invest risk capital. (2) Recognize price/value relationship. (3) Allow realistic depreciation. (4) Improve funding. (5) Abolish statutory renegotiation. (6) Reward research and development work, and justify its need for accessory products.

In terms of having a substantial share of the overall accessory market, there are no giants in the field. More than 1,000 companies are active suppliers and competitors. What can be

Behavior pattern of the accessory sub-system market



MARKET for accessory sub-systems averages more than $1.4 billion per year and is equal to the basic engine market (upper left). One-half of the accessories market is in the propulsion field, one-quarter in utility power, and one-eighth in conditioning equipment (upper right). The 1965 commercial accessory market will be about $210 million (lower left). The 1965 missile accessory market will be about $400 million (lower right).

The General Motors Matched Power Team of Allison Prop-Jet Engines and Aeroproducts Turbo-Propellers Brings Flight-Proved Jet-Age Power to Airlines of the World in The New Lockheed Electra

ELEVEN AIRLINES CHOOSE ALLISON PROP-JET POWER. The flexibility of Allison Prop-Jet power enables the Lockheed Electra to solve major problems facing the airline transportation industry—bringing jet-age speeds and comfort to medium- and short-range flights *economically*. These flights make up more than *90% of all air travel*. The Electra, with its four Allison Prop-Jet engines and Aeroproducts Turbo-propellers developing a total of 15,000 horsepower, can operate from existing airports *quietly* and *efficiently* under present air traffic control patterns. Electra purchases totaling $300,000,000 have been placed by 11 world airlines—a demonstration of their confidence in the ability of this luxurious airliner to fulfill its mission for air travelers everywhere.

GM CENTRAL MOTORS AIRCRAFT POWER

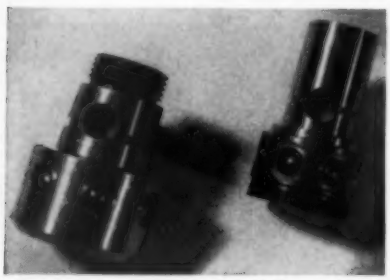
ALLISON DIVISION OF GENERAL MOTORS, Indianapolis, Indiana

ALLISON PROP-JET POWER

said about the leaders is that they have developed highly diversified product lines.

Thompson Products is one example of such a program. In 1946, the company was making engine-driven fuel and hydraulic pumps. In 1949, air-turbine fuel pumps were added. Then in 1950-51, Thompson expanded its product line further to include fuel-control components, shut-off valves, air-turbine drives and actuators.

Later, missile accessory power units, fuel systems and aircraft controls were put on. Today, Thompson Products can service almost an entire aircraft with accessory components. Of



BALL-PISTON ROTOR ASSEMBLIES, measuring 3" long. Similar units are used in GE's latest hydraulic turbopumps. Balls furnish piston action in an eccentrically rotating cylinder block, thereby providing the pumping effect.

incidental note is that the company has controlling interest in Ramo-Wooldridge Corp. and an agreement with Atlantic Research Corp. for developing solid fuels.

General Electric is another leader in the field, though it is doubtful that either this company or Thompson Products can claim even 10% of the total market. GE's highly diverse product line is fed by 10 of the company's departments. However, the aircraft accessory turbine department (AATD) accounts for over 40% of GE's sales of aircraft and missile accessories.

Although the department is called AATD, this is somewhat of a misnomer since many of the department's accessory products do not use turbines.

How a turbopump was improved

AATD is typical of an organization doing some advanced thinking and using risk capital to back it up. Here in some of the work this GE department is doing:

Several years ago AATD came out with a hydraulic turbopump. This device is a self-contained unit used to provide hydraulic power for the landing gear, control surfaces, in-flight refueling receptacle or any other hydraulically powered aircraft component. Bleed air from the engine compressor powers the turbopump. Therefore it does not have to hang from the powerplant but can be placed wherever it is needed.

This unit weighs 90 lbs., is nearly 3 ft. long, and can deliver up to 10.5 gpm at 2,650 psi. At no load output, the turbopump absorbs about one horsepower since the unit operates continuously.

Today, AATD has a hydraulic turbopump that is only two-thirds as long as the older unit and is about one-third its weight. Design flow is 8 gpm and hydraulic pressure is 3,000 psi.

The unit operates only on system demand, thereby reducing fuel consumption. Compressor bleed air is still used for power, but the new turbopump has only one-third as many parts as the older model. Advanced design eliminates the gear box that had been used previously. Turbine power is transmitted directly to a high-speed, ball-piston type pump. This direct-drive feature is said to be responsible for reducing unit weight, size and complexity.

The turbopump's primary control system has no rotating parts. It consists of a pressure-sensing device that turns the unit on and off automatically and a flow-sensing device that provides a biasing signal for control stability. A secondary control system provides starting and stopping of the unit, as well as unit shutdown at overspeed conditions.

New concept in actuators

For the past three years, AATD has been actively developing an air-turbine-driven actuator for extreme high-temperature operation. The result is the Turboactuator, which was designed specifically to operate components such as engine exhaust nozzles and thrust reversers. Normal operating range is pegged over 600°F.

In effect, the Turboactuator is a pneumatic servo motor. The power element is an air turbine consisting of a single wheel with two rows of blades pitched in opposite directions. Turbine torque is transmitted through a planetary gear train to a ball screw, which rotates in either direction.

Output is the linear motion of a ball nut driven by the screw. Actuator stroke for this application is limited by the length of the ball screw to six inches.

A source of high-pressure air, comparable to compressor bleed, is the turbine's power supply. The necessary pressure and air flow depend on the load. Maximum design load for the actuator is 6,000 pounds retracting and 4,000 pounds extending. For this loading, the actuator is designed to give its normal response rate with an inlet pressure of 175 psig and sea level exhaust.

This pressure may be considerably reduced without significantly affecting the response rate. At smaller loads, the inlet pressure can be reduced proportionally for the same response.

Inlet air temperature for the design load is 900°F. Lower air temperatures may be used since the torque and other performance parameters of this servo motor are relatively independent of air-supply temperature.

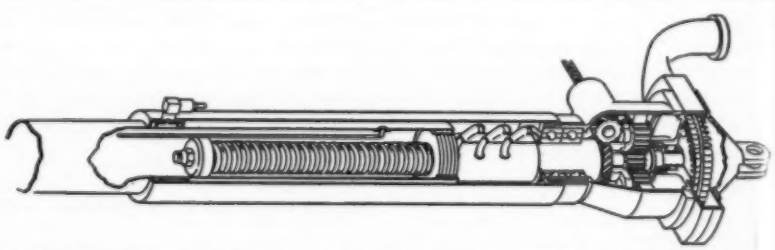
Turboactuator basic design data: Maximum extended length, 34¼ in. Minimum retracted length, 27¾ in. Diameter, 3.65 in. Linear velocity, 6-7 in./sec. Prototype weight, 21 lbs. Estimated production weight, 15 lbs. Air flow, maximum transient, 1.0 lb./sec. Air flow, holding, 0.13 lb./sec.

Self-powered unit for transient work

For missile accessory and aircraft emergency power, AATD has developed a self-contained self-powered system able to yield up to 10 horsepower. Fueled by a mono-propellant, the unit can provide electric power, hydraulic power or both. It weighs about 36 lbs.

This accessory power system is energized by an explosive cartridge, which provides part of the energy to drive a turbine. Simultaneously, a second cartridge ignites and transmits its pressure to a mono-fuel, which decomposes in a chamber and adds more energy to the turbine. In turn, the turbine drives two alternators (400-cps and 2,400-cps) and a hydraulic pump.

Despite the advances that GE and other companies are making in the accessory field, O'Connell and other industry spokesmen decry the lack of early cooperation they get from a large segment of the aircraft industry. They feel that if their engineers were called into a design project near its inception, their companies would be willing to invest even larger amounts of risk capital in accessory development, and in so doing would turn out superior systems.



TURBOACTUATOR is designed to operate in above 600°F environments and can give up to 6,000 lbs. linear force. High-pressure air enters hose on right and is led to the turbine. Output is the linear motion of a ball nut driven by the screw. Use is seen in exhaust nozzles and thrust reversers.

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Mercury
AMERICAN AIRLINES
"THE BEST MEAL I'VE EVER HAD ON ANY AIRLINE !
The best meal I've ever had on any airline has just been served. I thought you would like to know. The service was exemplary; your stewardesses are to be commended."
Myron Coleman, Irondale, Ohio

MERCURY SERVICE NEW YORK – LOS ANGELES

most frequent DC-7 nonstops–America's fastest airliner

radar-equipped · reserved seats
spacious lounge · superb cuisine
American's famous
stewardess service

AMERICAN AIRLINES
America's Leading Airline

VICKERS CONTINUING

America's new turbine-powered transports like

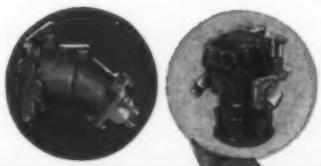
BOEING 707 — Variable displacement pumps for utility system and flight controls, hydraulic motors for wing flap drive, constant speed motor for air compressor drive . . . all Vickers equipment.

Vickers Incorporated, the world's largest manufacturer of oil hydraulic equipment, continues to supply lightweight, dependable hydraulic equipment for advanced aircraft applications. Since the introduction of the Vickers fixed and variable displacement axial piston pumps and motors for aircraft use in 1940, marking the beginning of the modern era in aircraft hydraulic system design, Vickers has consistently advanced the "state of the art." This extensive experience is reflected in the reliability of Vickers equipment which is installed on virtually every current U.S. military and commercial airplane as well as several aircraft registered in more than forty countries.

For further information, write for Brochure A-5200-ES.

NEADERSHIP

s vickers hydraulic equipment



DOUGLAS DC-8 – Variable displacement pumps for utility systems and flight controls, hydraulic motors for horizontal stabilizer actuation, constant speed motor for air compressor drive . . . all Vickers equipment.

802

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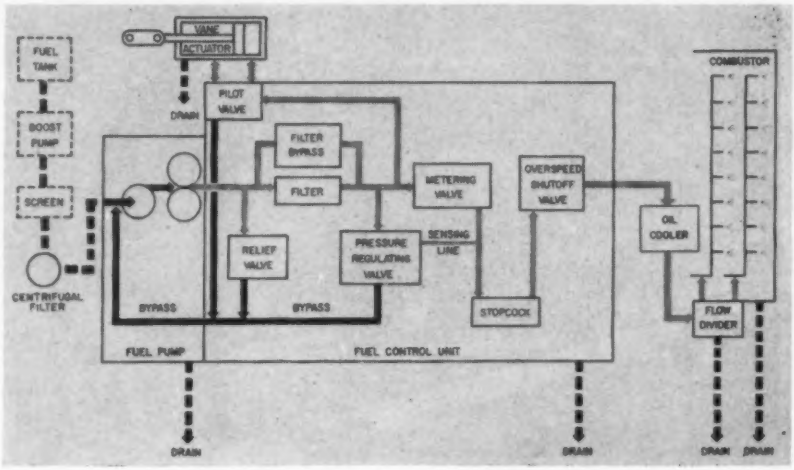
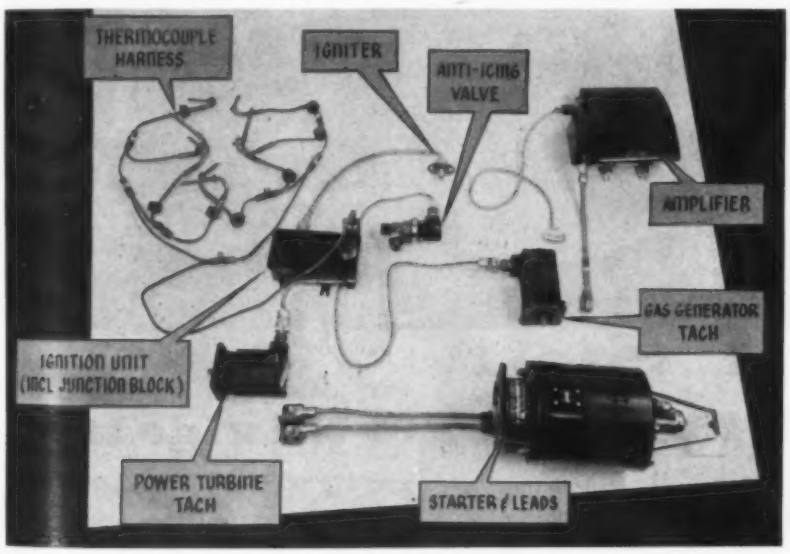
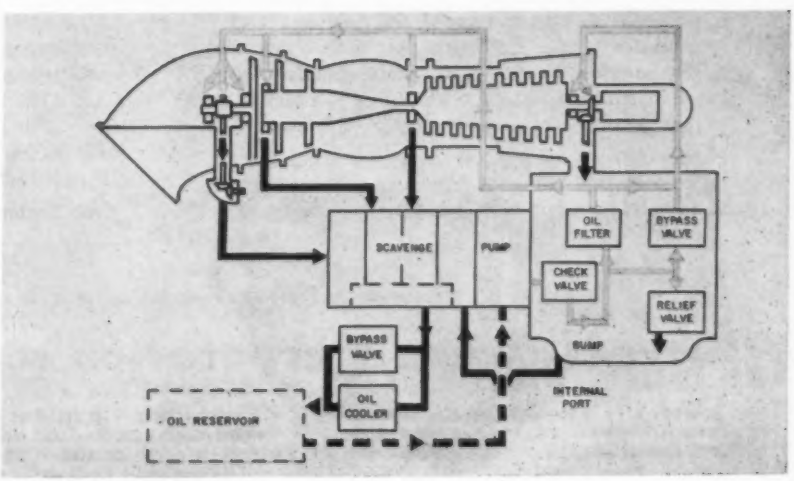
Accessory report . . . T58 turbine



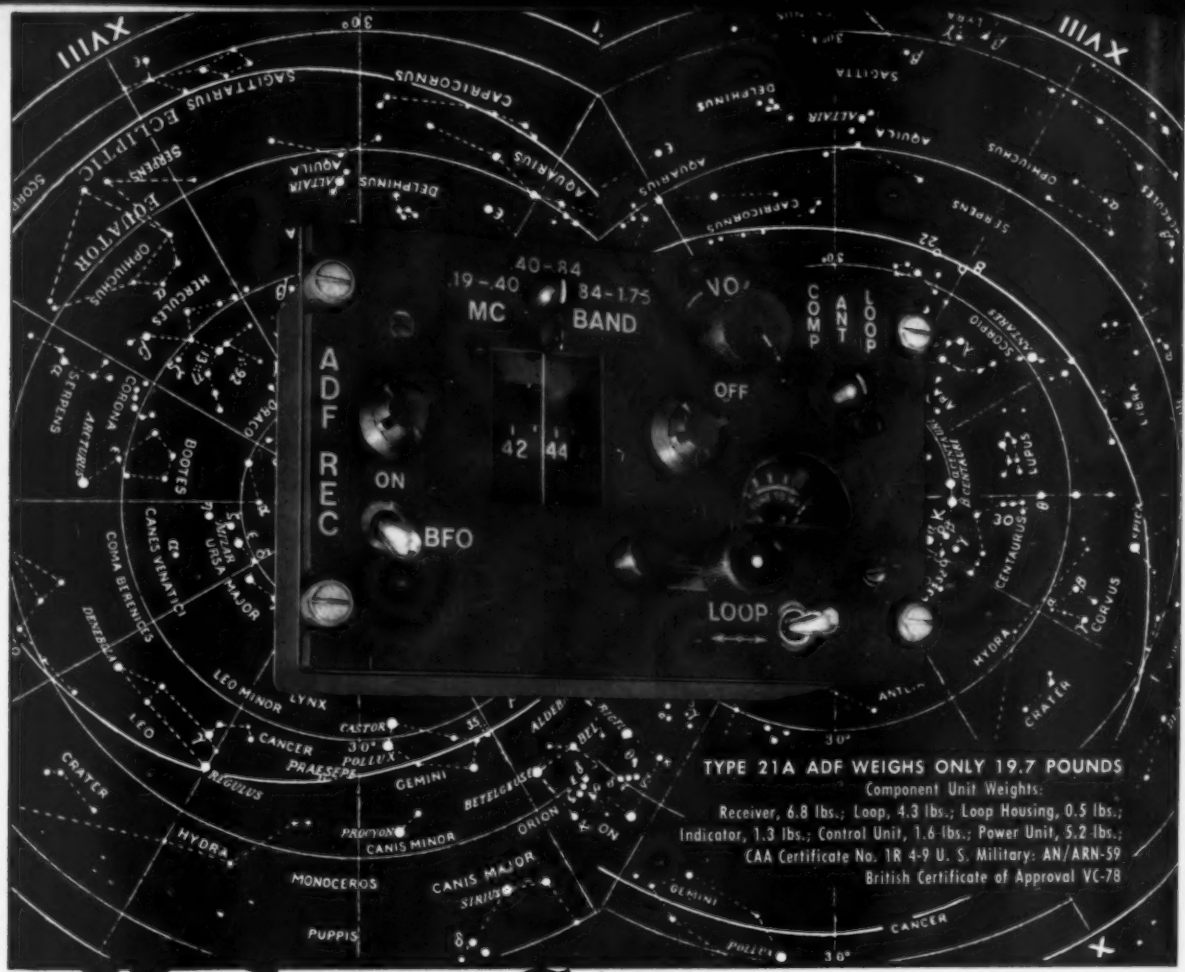
FUEL FLOW SYSTEM, General Electric's T58. Pilot valve is GE, fuel pump by Pesco Products Div., Borg-Warner Corp., fuel control by Hamilton Standard, oil cooler by Clifford Mfg. Co. and flow divider by General Electric. Solid lines show low-pressure fuel, gray lines high-pressure and broken lines indicate airframe-furnished components.



STARTER AND ACCESSORIES. Ignition unit by Bendix Scintilla, thermocouple harness by B. G. Corp., igniter by Champion Spark Plug Co., anti-icing valve by Century Controls Corp., amplifier by Pitometer Log Corp., starter and leads by General Electric or Jack & Heintz.



LUBRICATION SYSTEM SCHEMATIC. Scavenge pump by W. H. Nichols Co., oil filter by Air Maize or Aircraft Porous Media, bypass valves and check valve by Parker Aircraft Co., oil cooler by Clifford Mfg. Co. Solid lines indicate low-pressure and scavenge oil, broken lines show airframe-furnished components and gray lines high-pressure oil.



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Does plant location influence accessory sales?

Experience of Vickers' West Coast division shows it does; on-the-spot engineering results in 100,000-sq.-ft. operation

WHAT WAS a very small group of sales and service specialists only five years ago, the Western Aero Hydraulics Division of Vickers Inc. has expanded into a new 100,000 square-foot engineering and production facility at Torrance, Calif.

Several years ago the need for hydraulic design and on-the-spot engineering support of the West Coast aircraft industry led to the assignment of several design engineers to support Vickers West Coast sales in the preparation and presentation of new equipment concepts. Although some of the West Coast division's personnel were transferred from the company's Detroit headquarters, many of the present staff are newcomers from diversified allied fields of interest.

The small start blossomed into a full-blown engineering, production and sales facility at the then Vickers West Coast facility at El Segundo. Crowding forced the new plant's construction and left the El Segundo installation to the Vickers Machinery Products Division.

'Building-block' system

The basic reason for the western expansion has been the Aero Division's successful entry into the field of "packaged" or "integrated" hydraulic system components and subsystems, using time-proven components as "building blocks."

Essentially a design group, the Torrance division will carry its packaging concepts into a "family" of items where justified. This is exemplified in the company's new, constant-speed drive.

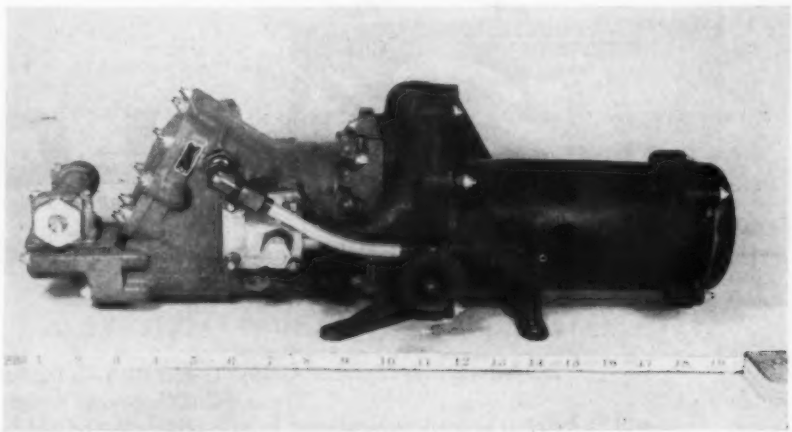
Using standard hydraulic rotating groups, planetary gearing and a governor, which has been in production for 12 years. Vickers has designed a series of packages ranging from 1 to 60 KVA in capacity. Up to 12 KVA these are simple hydraulic motors with integrated speed regulation valve assemblies. These take only that flow from a hydraulic system necessary to satisfy the alternator HP requirements. The larger size alternator drives are planetary gear assemblies with complete hydraulic system including integral pumps and motors for speed regulation. The larger drives are sandwiched between a drive pad and an alternator.

Although the Torrance Division has high production machinery, production items are usually sent to one of the three other Vickers Aero plants. Prototypes or limited runs are done at Torrance, but its prime purpose is engineering. Development of pumps, motors and some special components is done at Detroit, with the California location concerning itself with special valves and packaging.

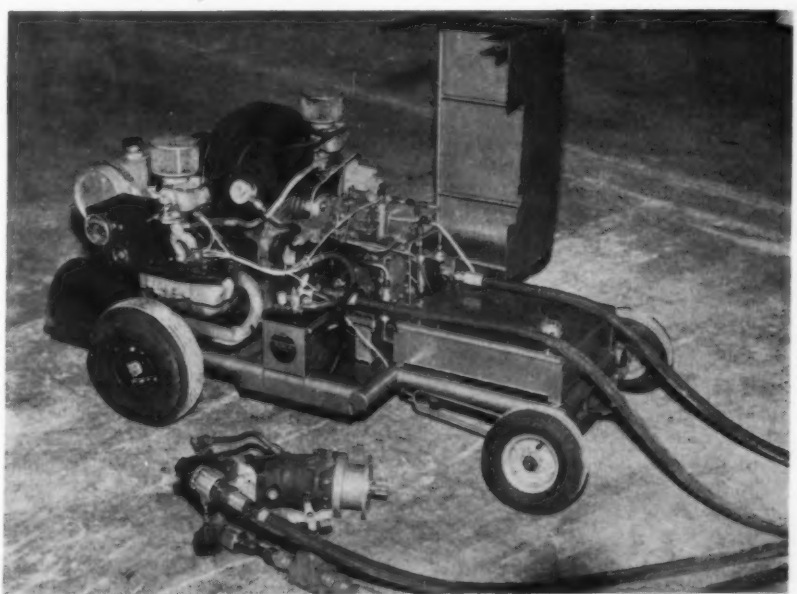
The company says the package philosophy seems to rub off on its engineering staff and builds a team effort between sales, preliminary design, project group, product service and manufacturing. This cooperation extends to the Detroit plant, which makes its computer services and all pertinent research and development information available to Torrance projects. Conversely Detroit sometimes asks Torrance for special services to support some of their programs.

A good example of this design philosophy is the Vickers motorpump for hydraulic systems in Lockheed's Electra turboprop transport.

In keeping with the Lockheed "service center" concept, the pumps on the Electra are not directly engine-driven but are electric-motor driven



10-H.P. MOTORPUMP for use on Lockheed Electra. Centrifugal pump between variable-displacement piston-type pump and liquid-cooled electric motor is for cooling circulation and piston-pump supercharging.



'BREADBOARD' MODEL of a lightweight hydraulic starting system for jet aircraft. Easily moved from point-to-point by one man, unit is prowered by a 50-hp German Porsche engine. Starting tests are said to be comparable to other means while using less than 40% prime mover horsepower.

B·O·A·C

World leader in jet travel

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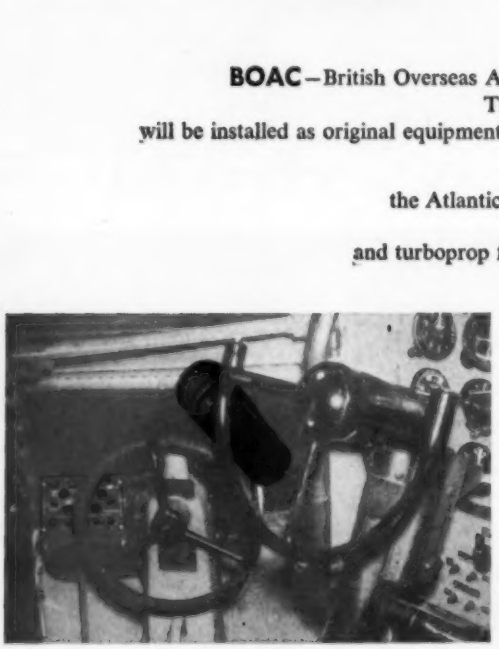
Edo LORAN

BOAC—British Overseas Airways Corporation—is the latest international airline to order Edo Loran. The new Edo long-range navigation system, already thoroughly flight tested, will be installed as original equipment as BOAC takes delivery of the Bristol jet-prop Britannias it has on order.

As a result of extensive operational appraisal across both the Atlantic and Pacific Oceans, Edo's pilot-operated Loran has already been selected by Pan American World Airways, Qantas and Cubana for their jet and turboprop fleets. Other international carriers are currently evaluating the equipment.



Installation of Edo Loran in Pan American Boeing Stratocruiser shows compact design and convenient mounting for pilot operation. ¾ ATR receiver unit is remotely installed.

Airline pilots and technicians alike endorse Edo Loran for speed and ease of operation, accuracy, and reliability in service. Precise fixes are obtained by the pilot in a matter of seconds from the direct-reading cockpit display. Weight of entire unit is only 29 pounds. Design and performance of this new Edo Loran, plus the acknowledged reliability of the Loran System, make this the logical choice as basic long-range navigation equipment for modern airliners.

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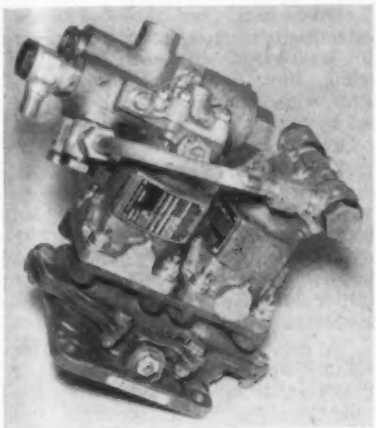
and mounted in the usual fuselage hydraulic compartment with the majority of other hydraulic equipment.

This presented several new design considerations for accessory manufacturers—to meet such a motorpump requirement with minimum weight penalty.

Vickers coupled a liquid-cooled, 400-cycle, 200-volt motor to a variable displacement piston-type pump and



DUAL constant speed motor packaged by Vickers from adaptation of standard components. A speed regulator valve is included for an alternator drive.

achieved a 31-lb., 20-in.-long package that delivers up to 8 gpm at 2250 psi and reduces to 6 gpm at 2950 psi. The 10-horsepower unit is rated at 2,000 hours service.

Two of the motorpumps continuously supply power to the primary hydraulic system. A third unit serves as a secondary system standby to supply power to the No. 2 control surface booster cylinder and the No. 2 flap motor.

Efficiency vastly improved

Existing hydraulic system fluid used as the coolant eliminates a need for ducting air to the electric motor. A remotely-positioned heat exchanger can be used if fluid temperature control is needed. The unit may also be sealed in an insulated compartment for noise reduction. Overall efficiency is said to exceed 75% over oil temperature ranges up to 200°F.

The motor is manufactured to Vickers specifications, but the principle of liquid-cooled electric motors is certainly not new. Nor is the axial piston pump which the company has been producing for many years. The only new item is the "package" which accepts a single oil-in flow, pre-pressurizes it, diverts some for electric motor and pump cooling and delivers the rest at system pressure to the aircraft hydraulic work areas.

Maintenance problems can be considerably minimized in the package concept. In the case of the motorpump, much valving can be made within the

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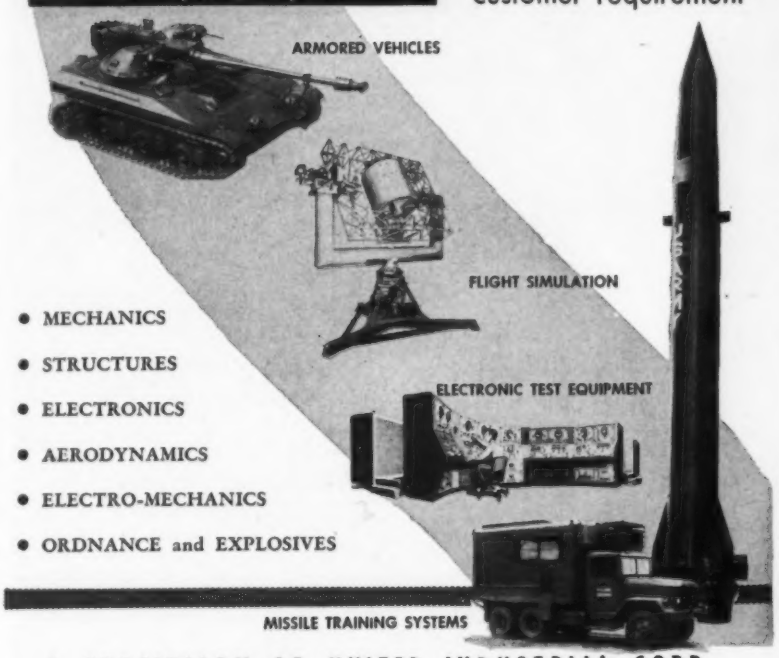

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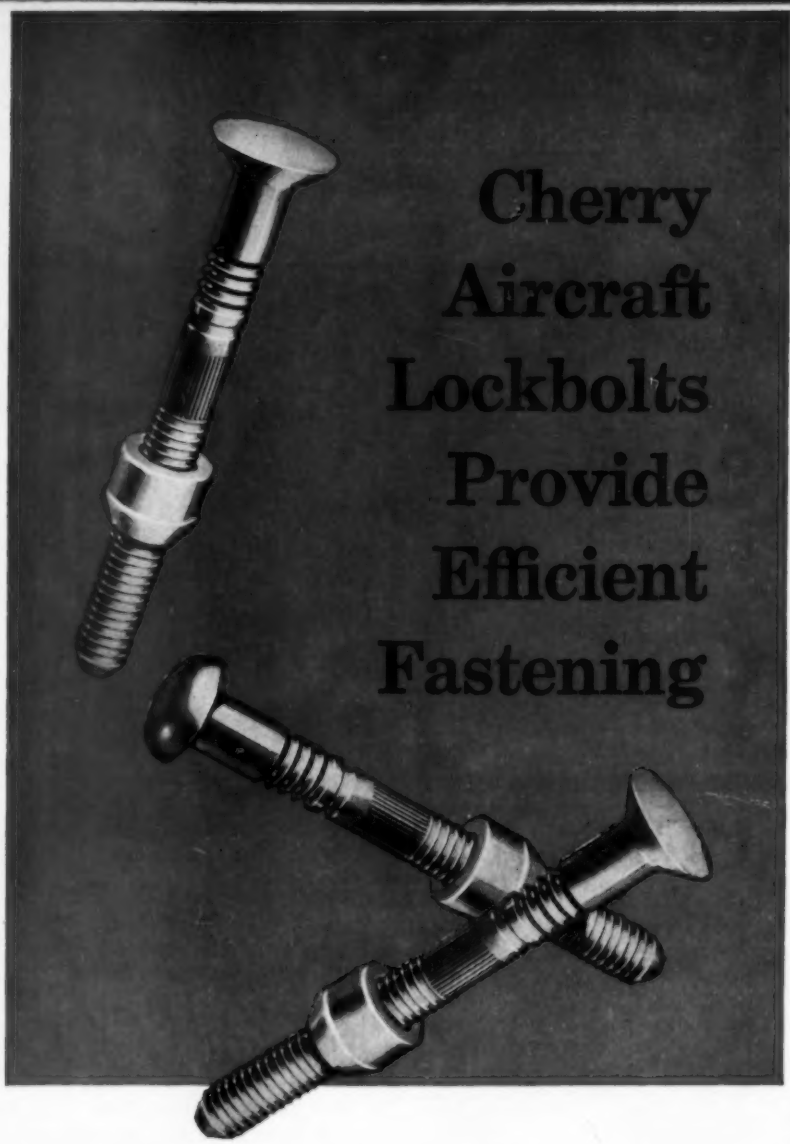

Cherry Aircraft Lockbolts* save weight—give higher clinch than rivets—more uniform clinch than nuts and bolts—combine advantages of both—eliminate disadvantages.

Cherry Aircraft Lockbolts are available from complete stocks in a wide range of diameters, grip lengths and head styles in alloy steel and aluminum alloy.

Cherry Aircraft Lockbolts are designed and produced to meet specifications and requirements of the aircraft industry.

For data on Cherry Lockbolts, write for bulletin TCL-111 to Townsend Company, Cherry Rivet Division, P. O. Box 2157-Y, Santa Ana, Cal.

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CHERRY RIVET DIVISION

SANTA ANA, CALIFORNIA

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package to produce a "remove and replace" type of repair rather than an expenditure of time in tracing a malfunction through a spread-out system.

Economics also enter the picture. The use of many standard parts which have been in high-rate production for some time, reduces initial development costs as well as tooling. The new oil-cooled motorpump then is typical of the new Vickers systems engineering activities.

Other packages turned out by the facility include a constant tension probe and drogue reel drive for Flight Refueling, Inc., Baltimore. This unit, a motor with integral control valves, is used by North American-Columbus and by Douglas-El Segundo.

Torrance also has done much development work on packaged hydraulic starting systems for turbine engines. The breadboard unit, driven by a 50-hp, air-cooled German Porsche engine, has been quite successful in tests on Pratt & Whitney J57 engines, and on the Allison 501 turboprop engine.

At present, a second version of the hydraulic starting package is being built for Boeing. It will be used to start any of the three 707 powerplant types. This unit will use a Chevrolet V-8 engine with a special flywheel housing adapter for the hydraulic pump.

Another project is a proposed 70-hp airborne hydraulic starting system package weighing about 170 lbs., which would be able to perform a variety of auxiliary power functions prior to and during flight. In the fullest exploitation of such a system, the pad-mounted starter motor would become an engine-driven hydraulic pump after the starting cycle is completed. The pump-motor is standard. The control valving is special.

In the ultimate airborne system, Vickers-Torrance engineers foresee an electric motor driving a pump which supplies power to the starter motors until the engines are started. Then, the entire system would reverse itself—the starter motors become pumps, supplying power to the original pump, which then becomes a motor and drives the electric motor as a generator!

Old Vickers pump tailored to new needs

Vickers, Inc. of Detroit has come up with a miniaturized version of its 25-year-old industrial vane-type hydraulic pump as a new answer to space and weight economy in high-speed aircraft and missiles.

The design, except for miniaturization, is a carbon copy of that used by Vickers in production of more than 4.5 million vane pumps for automotive power-steering during the past six years alone.

Initial design emphasis at Vickers was directed at developing a minia-

turized vane pump as an inexpensive item for nonrecoverable missile uses. However, results of early performance tests showed efficiencies and endurance potentialities that led Vickers to expand the emphasis beyond the pure missile role, Vickers officials explain.

For example, a qualification 1,000-hr. test was run at 1,000 psi and 10,000 rpm using standard MIL-0-5656 fluid at 160°F and 14.7 psia inlet pressure. Throughout the test, the vane jump showed no appreciable drop in volumetric efficiency and all parts were in good condition at the end of the run.

In more recent trials, Vickers found that speeds of 15,000 rpm and pressures up to 2,000 psi are practical without adversely affecting performance or operating life.

Heart of the "new" Vickers pump is a pumping cartridge which consists of but a few parts—ring, cam rotor, vanes, pressure plates, drive shaft and 0-rings. All are free fit and can be assembled in seconds without special tools, jigs or fixtures.

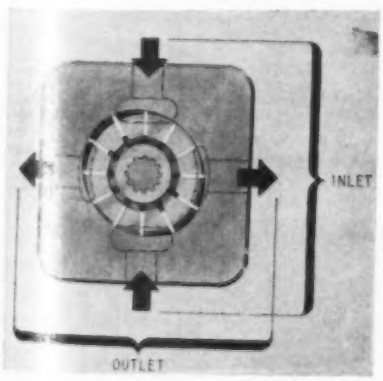
The assembled cartridge weighs only about 2.5 oz. and has a fixed displacement range from 0.015 to 0.038 cu. in. per revolution. To alter the displacement, only the pump cam need be changed.

Versatility key attraction

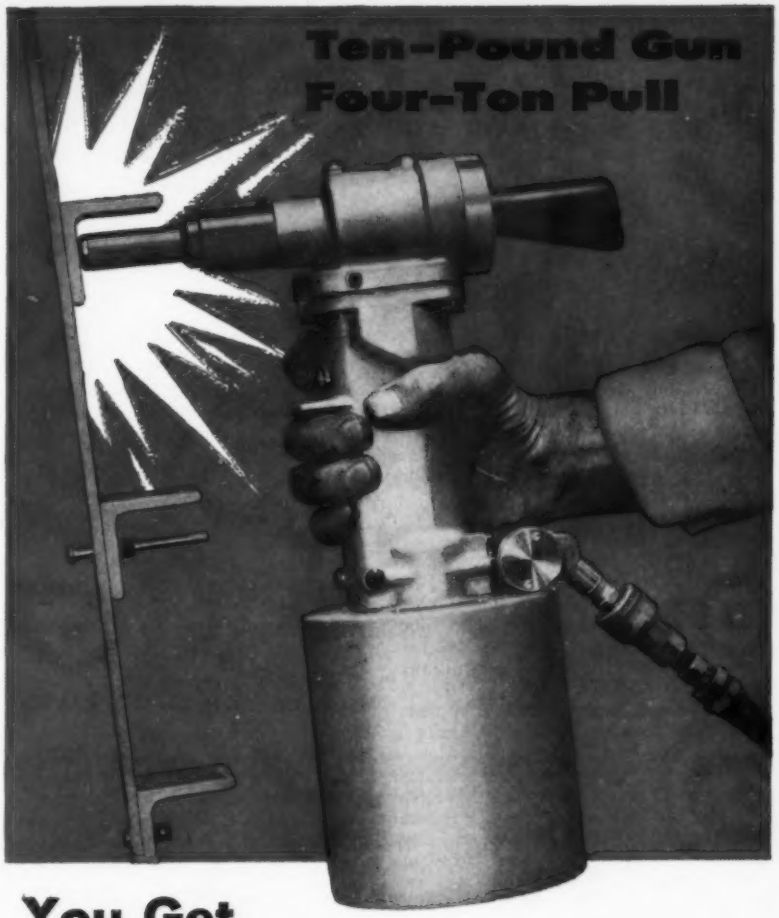
Vickers officials point to the versatility of the vane pump as the key attraction in its adaptation to a variety of aircraft and missile uses. Cartridge-type construction allows for building-block or plug-in configurations.

Furthermore, the drive shaft can be extended from either the tank or pressure and of the cartridge to allow "stacking" of cartridges. Stacked cartridges can be arranged with a common inlet and separate outlet ports, or with separate inlets and outlets.

Miniature vane pumps can be manifolded effectively with servo valves, or with miniature hydraulic motors and electric motors, Vickers engineers say.



INTERNAL SKETCH of vane pump illustrates how circular rotor turns in elliptical cavity. Vanes moved outward by centrifugal force to follow cavity wall at about 600 rpm. Below is exterior view.



You Get MORE POWER—Less Weight with the *New* CHERRY G-85 Lockbolt Gun

The new Cherry G-85 lockbolt gun is designed to give you maximum pulling power with less weight. Its simplified rugged construction assures low maintenance costs. The gun weighs only 10.5 pounds, which reduces operator fatigue.

No special air supply is required with this lightweight gun, because it develops this high capacity at normal line pressure.

As the leader in the field of special aircraft fasteners, Cherry Research and Development department has produced this new lightweight, high capacity gun to increase the efficiency of installing lockbolts.* The G-85 gun may be adapted for setting stainless steel, monel, aluminum and carbon steel Cherry blind rivets.

For information on the new Cherry G-85 gun write Townsend Company, Cherry Rivet Division, Post Office Box 2157-Y, Santa Ana, California.

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CHERRY RIVET DIVISION

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Systems management produces

Turboprop from scratch

. . . in 26 months!

by Richard van Osten

BURBANK, CALIF.—Lockheed's California Division gambled here 26 months ago on a new "systems management" approach to building a commercial turboprop. Today that big gamble is paying off.

To put a modern transport in the air in 26 months after a scratch start is not easy. Lockheed's extensive background in commercial aircraft was some help in the Electra, but not as much as might be expected. The Electra was a completely new concept that required some completely new thinking.

In the first place, this was the division's initial program under the "systems management" approach. Quite a bit of personnel reorganization was necessary to align engineering and test programs exclusively for the Electra.

J. F. McBrearty, asst. general manager for commercial projects, says that one of the early-stage problems was "to make sure the Electra was not getting loaded with a lot of the stuff people like to hang on airplanes." A high degree of coordination had to be maintained between Lockheed, the airlines, Allison and Aeroproducts—a relationship that is still paying big dividends in the program's progress.

In essence, the aircraft came directly from drawing to production. As fast as a system preliminary design was approved, a breadboard model was built and put under test in the engineering labs.

But the testing programs did not trail one another as is often done. Most of these were run concurrently.

McBrearty describes this as "sectional testing" or an "engineering sandwich" with many of the Electra's functional systems undergoing simultaneous evaluation for individual operation and compatibility.

Previous experience helped

One facet of the division's background that proved invaluable in preliminary design stages was its prior experience with turbine-powered aircraft. The California division had designed and built the not-too-successful XFV-1, a VTOL "tail-sitter" powered by an Allison T40, two Air Force YC-121Fs and two Navy R7V-2s powered by Pratt & Whitney T-34s. It had also designed and built the first C-130s now in production at the Georgia division.

"These were definite contributions to our Electra thinking," says McBrearty. "We learned what to do and what not to do in engine-propeller combinations."

Using this experience as a springboard, Lockheed jumped into several parallel flight-testing programs. The original No. 1 Constellation was fitted with one complete Electra powerplant and nacelle package. In addition, at a somewhat later stage, a Constellation (R7V-2) with four Electra power packages (the "Elation"), was developed and flown.

In the meantime, Allison was conducting its own tests on the proposed Electra unit in its much-publicized "Operation Hourglass," making the Allison 501-D13 one of the most-tested engines ever to be put on a new aircraft.

During all testing and development stages, both with systems and powerplants, the engineering staff maintained continued coordination with the airlines.

"When they have something to say," notes McBrearty, "we listen real hard."

As airframe and system components moved into production, things were rushed along by another policy in the Electra design—simplicity. Some of the equipment was "new" in the manner in which the Electra would use it,

BETTERING guaranteed performance figures, Lockheed Electra eases in over blast fence at Burbank, Calif. terminal at end of 4½-hour proving flight. Landing (like takeoff) was made in less than 1,900 ft. of runway.

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Backed by over one *million* hours of world-wide operating experience with over 250 Viscounts. Performance-proved Rolls-Royce jet-prop "Dart" engines are unsurpassed for reliability and ease of maintenance.

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High-Density Capacity

Accommodations for up to 65 passengers. Handsome interior furnishings are exceptionally hard wearing. Carry-on baggage racks are provided.

Low Operating Costs

As demonstrated by actual airline experience, Viscount operational costs are lowest of all modern 4-engine aircraft. The new local service Viscount will be highly economical even on the shortest routes.

Routing Flexibility

Can operate from 5000′ runways (shorter with slightly reduced weight) . . . can fly up to 5 short sectors without refueling or ground servicing.

Rugged Construction

In this Viscount development special attention has been paid to the conditions of low-level operation. The landing gear and systems operated in the landing and take-off cycle are particularly rugged.

Fast Turn-Around

Cargo can be loaded while #4 engine is running, driving generator and hydraulic pump, permitting internal starts . . . underwing fueling (in addition to overwing) . . . integral passenger steps hydraulically operated.

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For a complete cost analysis of *your* specific routes by an experienced Vickers engineering team, call or write: Christopher Clarkson, U.S. representative, 10 Rockefeller Plaza, New York 20, N. Y.

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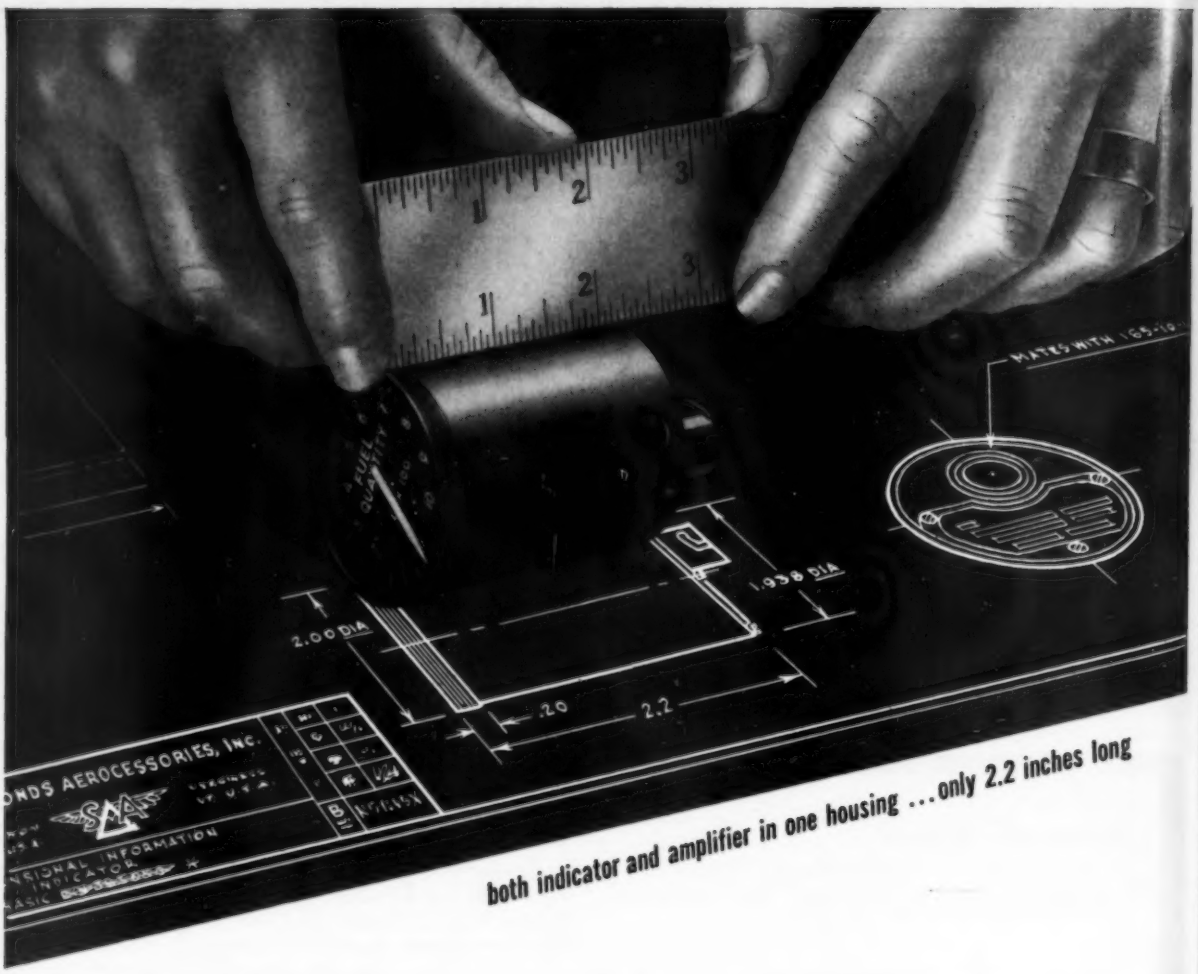

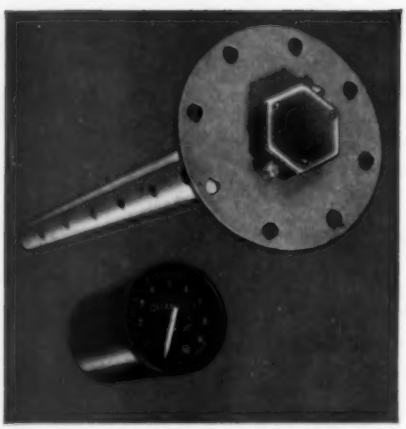

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Electras take shape . . . in a hurry

PROOF POSITIVE of Lockheed's 26-month design and production "miracle" is this final assembly line at Lockheed-California. First Electra in line is slated to join two others in Lockheed's proving program next month. Second carries Eastern Air Lines markings with the over-window inscription "Fly Eastern's Electra Prop-Jet." Third is marked "Prop-Jet Electra" in colors of General Motors Allison Division.

but it was mostly an expansion of well-proven components which had been repackaged or re-integrated to fit the propjet's advanced requirements.

Month ahead of schedule

The accent on simplicity of design and thoroughly tested components has had its influence on the flight-test program, which is now one month ahead of schedule while only three months into the program.

R. L. Thoren, the division's asst. chief engineer and chief of engineering flight test, credits the reliability of the Allison powerplant, the "high state of perfection of the systems," and the recent opening of the new Burbank flight-test facility, as the three most important factors contributing to the speed of the flight-test program.

For the first time at Lockheed all the people involved in flight testing are under one roof, Thoren notes, and as a result Electra testing is moving at a faster rate than any other aircraft in the company's history.

In comparing the current program to past aircraft, he says the P2V-7 Neptune achieved only about 0.5 hour per calendar day; the 1049G Super Constellation about 1.2 hours; and the Electra is accomplishing an average of 1.5 hours.

When the accelerated service tests for the CAA are run off later this year, Thoren expects the approximately 150 test hours to be accomplished at a rate of 10 hours per calendar day.

He also credits the Electra's "service center" concept with the low maintenance time during flight test. Three major service areas, air-conditioning, electrical and hydraulic, are each accessible through fuselage doors, thus making it possible for maintenance personnel to perform their tasks without getting in each other's way.

Flight-test engineers also praise the "upstream" windtunnel testing program which has resulted in trouble-free performance, and has not required any major aerodynamic changes.

Three Electras are now assigned to the flight-test program. By March 1, the first aircraft (1001) had flown more than 91 hours in 57 flights. This particular aircraft is equipped with a water ballast system for aerodynamic checks, etc.

The second Electra (1002) had flown more than 17 hours in 13 flights and was three weeks ahead of schedule. This aircraft is equipped with an almost normal complement of Teco seats, which Lockheed had made up for this aircraft, and is being used for a check of functional systems.

The third Electra in flight test (1004) is also ahead of schedule and is slated to fly April 10. The No. 3 aircraft (1003) is the static test ship that may be converted to one of the company's proposed military configurations.

In keeping with the accelerated program, the CAA certification date has been advanced to a target of Aug. 22, and Eastern Air Lines is scheduled to take its first Electra (1005) on Sept. 1.

Tests are being continued with the original Constellation, which is now a regular mish-mash of engines, including a Wright 3350, two Pratt & Whitneys, and the latest addition to the No. 4 position, an Allison 501-D13A for tests with the solid-dural Hamilton Standard propeller as specified for the KLM Electras.

Thoren says that the only problems in the flight-test program to date have been "normal accessory problems." But one detail that Lockheed has encountered may dismay operators who favor gay exterior color schemes. It seems that the synthetic oil used in the turbine has an adverse effect on the white paint of the nacelles, turning them into something that looks like a dirty fried egg. The company says it will recommend that the nacelles be left in their natural metal tone.

The fact that Lockheed has faith and enthusiasm in the Electra's future is obvious, but McBrearty has some interesting comments as to the overall future of turboprops.

Asked if he thought the Electra might lead Lockheed into a "family" of such aircraft, he said that it "probably would."

"It will be a family, not in size, but in capabilities," he noted, "with improved performance and improved aerodynamic characteristics."

He also feels that the future of turboprops as the ideal transport over short and medium-range hauls is assured until someone comes up with a workable VTOL transport, "maybe in about 10 years." He does not believe that there will be any "intermediate" design.

AiResearch temperature-control test set for Electra checks 70 units in 20 minutes

AiResearch Manufacturing division of The Garrett Corp. has developed a unique temperature-control system test set for the Electra, which makes it possible to test functionally 70 components in the almost unbelievably short time of 20 minutes.

These components include radiant panel heater relays, overhaul door actuators, temperature sensors, manual override switches, program position indicator, freon pressure regulator actuators, bypass valve actuators, damper valve actuators, freon motor relay and condensor door relay.

The test set incorporates an edge-lighted panel to facilitate operation in poorly-lit areas, a null indicator, a dc bridge, a light assembly containing test and indicator lights, a bridge balance control and all circuitry necessary for temperature-control circuit testing.

Test programming is accomplished through the use of an internal stepper and panel-mounted selector switches. Test performances are indicated by indicator lights, meter null, meter movement, program position indicator rotation or by visual observation.

This test set replaces the temperature controller module during test. Unit's dimensions—19.56x7.63x9.25" and design are such that it readily fits into the controller module rack, thereby eliminating excess cables.

Only aircraft requirements necessary for testing are energized ac and dc power busses. The set weighs approximately 20 lbs.

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Locals need more $$, less talk from Congress

by Selig Altschul

THE CAUSE of the local service airlines received a strong moral boost with CAB Chairman James R. Durfee's recent admonition to congressional groups to back the industry with the necessary appropriations after endorsing expanding local airline services.

Durfee hit at the crux of the local service airline dilemma when he pointed out that the examiner's recommendation for expanded service in the Seven States Area case would entail additional annual subsidy of $2.5 million. Nevertheless, this route expansion was widely supported by congressional and other civic groups.

It is the same type of grass-roots support, as expressed through Congress, which led to the quick enactment of the measure providing permanent enfranchisement of the local service airlines in 1955.

But this same enthusiasm by Congress is not always present when it comes time to vote the necessary subsidy appropriations to assure continued operation of the local service airlines. Recognition by Congress that such subsidy appropriation is a necessary concomitant of route authorizations would go a long way toward infusing some strength into the financially anemic local service carriers.

Mail pay support received by the local service airlines is essentially a subsidy to the communities served and not to the carriers themselves. Certainly, financial results of the feeders reveals that they or their stockholders definitely have not benefited by the subsidy support received thus far.

The larger table on this page reveals key financial elements in the position of the individual local service and helicopter lines for the fiscal year ended June 30, 1957. The feeders are clearly underfinanced—a condition aggravated by a lack of earnings. In other words, debt, long and short-term, and other current liabilities (trade creditors) have been carrying the burden in financing total assets. Despite subsidy representing an average of more than one-third of total operating revenues, net losses predominate. (Retroactive mail pay awards may reduce the size of these losses but are unlikely to alter the picture appreciably.)

Consistent congressional action (as manifested by permanent enfranchisement of the feeders and support of route extensions in various CAB proceedings) in effect has set national policy favoring the existence and expansion of local airline service. But once Congress has placed this policy in effect, it ought to be prepared to implement such directive with the necessary appropriations.

To do otherwise places the CAB in the ironic predicament of authorizing local service airline extensions under congressional mandate and urgings, yet ultimately encountering resistance from that same source for the essential financial support through subsidy appropriations.

The sharp limitation in subsidy funds made available to the CAB may well be one reason why the Board staff has consistently made extensive disallowances in establishing mail rates for the individual carriers. Limited subsidy money has had to be stretched and made to cover all subsidized carriers. This has meant that not a single carrier has received adequate support. This has led to major financial deficiencies in the group, compounded by the vital need to acquire more modern and efficient aircraft.

Nevertheless, subsidy payments for the local service airlines have been rising steadily. As shown in the lower table, subsidy payments to these carriers are reaching new peaks every year and, significantly, are projected to ac-

Financial picture for local service & helicopter carriers

Fiscal year ended June 30, 1957

Local service	Total assets	Total net worth	Total subsidy	Net income (or loss)	Subsidy % of total op. rev.
		(in thousands)			
Allegheny	$ 3,648	$ 609	$ 2,334	$ (270)	28.5
Bonanza	1,803	906	1,275	14	37.5
Central	1,629	458	2,450	(70)	60.8
Frontier	1,806	472	2,481	(37)	40.2
Lake Central	1,305	(133)	1,348	(148)	46.4
Mohawk	7,916	336	1,281	(745)	19.6
North Central	4,083	804	1,334	(345)	15.3
Ozark	3,043	810	2,787	(401)	41.3
Piedmont	3,764	1,725	2,166	358	31.4
Southern	1,487	679	1,901	33	44.2
Southwest	4,442	1,568	1,792	92	31.0
Trans-Texas	2,155	853	3,075	61	44.4
West Coast	2,175	726	1,728	(4)	41.8
Total	$39,256	$9,813	$25,952	$(1,101)	34.5
Helicopters					
Chicago	$1,864	$ 686	$1,175	$(41)	81.1
Los Angeles	1,121	725	978	142	72.0
New York	2,377	2,116	1,664	(310)	72.8
Total	$5,362	$2,377	$3,817	$(209)	74.4

SOURCE: CAB recurrent reports.

Subsidy estimates, locals vs. total U.S. air carriers

Estimated Subsidy (in thousands)

Fiscal year	Local service	Total all carriers	% Local service of total
1950	$15,048	$83,512	18.0
1951	17,310	69,649	24.8
1952	18,990	63,536	29.9
1953	21,800	66,641	32.7
1954	24,300	64,309	37.8
1955	22,637	44,773	50.6
1956	24,910	44,445	56.0
1957—Projected	27,196	43,141	63.0
1958—Projected	27,805	39,851	69.8

SOURCE: Bureau of Air Operations, Civil Aeronautics Board—April 17, 1957, budget memorandum.

count for almost 70% of the total subsidy support for all carriers for the current fiscal year.

The administrative separation of subsidy from total mail payments was made starting with the 1951 fiscal year. Hence, fiscal 1951 is the first annual period for which subsidy payments to the trunks can be measured and which amounted to $17.6 million.

Subsidy payments for the domestic trunks have been reduced sharply, falling to $6.4 million for fiscal 1952 and trailing off to $1.2 million for 1957. Subsidy payments to the local service group, of course, have exceeded that of the trunks starting from fiscal 1952.

Yet, to fulfill their objectives as endorsed so enthusiastically by Congress, the local service airlines require even more subsidy support if they are to attain financial respectability.

In the past year, certain legislation has been enacted with the stated purpose of helping the local service airline group. One measure was the so-called Equipment Trust Bill. As the writer has pointed out (AMERICAN AVIATION, Nov. 4, 1957, p. 35): "This bill, while a desirable piece of legislation, is at best only an incidental device that may at some future point be helpful in the financial processes of the airlines. It will most definitely not attract capital in itself to the industry, at this time or in the near future."

The CAB-sponsored measure for government-guaranteed loans for the local service airlines was another crutch for the group. Under this measure, up to $5 million per airline and 90% of the total loan can be guaranteed by the government in the acquisition of new or approved aircraft.

While this is a great help, airlines availing themselves of this measure still have the problem of obtaining additional capital from other sources. This includes the remaining 10% or up to $500,000 of the maximum plus working capital for indoctrination, integration, sales promotion and other related expenses. It also does not take into consideration other property acquisitions such as ground facilities for maintenance and passenger service equipment.

It is only necessary to examine the financial position of the shipping industry, where government guaranteed loans already prevail, and it will be quickly realized that this form of legerdemain offers no lasting panacea to the local service airlines.

What is required to establish financial respectability among the local service airlines—and for the trunks as well—is a condition where earnings can be generated. Such an atmosphere can attract capital to the industry through normal means and affords various means of financing. If anything, there can be a real disservice to the local service airlines if the Equipment Trust Bill and the Government-Guaranteed Loans measure are viewed as solving their problems.

Once having given life to the local service airlines and endorsed their route extensions at every turn, Congress, if it wants the group to succeed, has the power to make this possible. All that is now required is affirmative support through adequate subsidy appropriations.

AA to realign functions of sales department

When Charles Rheinstrom joins American Airlines in April as executive v.p.-sales, a major realignment of certain functions in the sales department will take place.

AA's customer service department will be abolished. In its place, a passenger sales service department, headed by G. Marion Sadler, now v.p.-customer service, will be established.

Public relations, now reporting to president C. R. Smith, will report to Rheinstrom, but will continue to receive overall policy direction from Smith.

Board blames NEA pilot for Rikers Island accident

Failure of the captain to "properly observe and interpret his flight instruments and maintain control of his aircraft" was given by CAB as the probable cause of the Northeast Airlines DC-6A accident on Feb. 1, 1957, at Rikers Island, N.Y.

Twenty of the 101 persons aboard the New York-Miami plane, flown by Capt. Alva V. R. Marsh, were killed in the accident which occurred less than one minute after takeoff from LaGuardia Field.

"It has been shown beyond a reasonable doubt that the aircraft and its accessories were functioning normally throughout the short flight," CAB said. "This being so, we must conclude with reasonable certainty that the events leading up to this accident point to the actions of the captain, who was at the controls and in complete command, in that he did not demonstrate the skill and care required of an airline pilot in the performance of his duties. The captain's contention that he thought everything was normal until the first officer sighted the ground and quickly advised him further substantiates the Board's opinion that the captain did not have control of the aircraft."

The plane was airborne about 31 seconds, traveled 6,600 ft. and turned approximately 119 degrees to the left. Both captain and first officer testified they observed no indication of any irregularity or deviation from takeoff heading, CAB said. It added that "it is evident that Capt. Marsh did not take full advantage of his full instrumentation nor did he rely upon primary instruments." Flight was at night under IFR conditions.

CAB noted that Capt. Marsh had been in command of two NEA Convairs "involved in accidents at La Guardia Field." One, in 1952, was found by CAB to be the result of pilot error culminating in a water landing during final approach. The other, in 1953, was determined by CAB to have been caused by propeller malfunctioning during the landing. Neither resulted in fatalities.

In the Rikers Island accident, CAB said it was "concerned by the difficulties experienced in evacuating passengers after the airplane came to rest. The jamming of the main door and the non-operation of the automatic lighting system apparently hindered speedy evacuation. The Board is studying this problem.

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Lockheed's Gross blasts CAB for 'dilatory tactics . . . bureaucratic ineptness'

Scathing criticism of CAB for refusing to grant the airlines an adequate fare increase has come from an aircraft manufacturer.

In a message to stockholders, Lockheed Aircraft board chairman Robert E. Gross used such terms as "dilatory tactics . . . cavalier treatment . . . and bureaucratic ineptness" in expressing his opinion of CAB.

The recent 4% plus $1 increase is "wholly inadequate," he said, adding: "By giving a stone when the airlines are sorely in need of bread, by dragging out hearings and postponing action, by assuming an attitude of indifference to the airlines' efforts to put themselves on a more robust basis, the Board is demonstrating one of the greatest dangers that confront us—cumbersome governmental procedures that block quick, sure decisions."

The manufacturers "are dependent upon (the airlines') health for a large part of our own success" but the situation is "even more serious to us as citizens concerned with the preservation of our competitive system and our national well-being."

Airlines have ordered $2 billion worth of jets and turboprops, and "this is only the first step," he said. "Next will come the supersonic transport . . .

"But the next few months are crucial. The whole new equipment provisioning program is threatened. If our airlines do not take this necessary first step, or if they delay taking it, they may lose the entire race by default . . .

"The CAB seems to harbor a prejudice against profitable operation of America's privately-owned air transport industry. Its five members and staff are effectively retarding progress in a vital section of our economy and endangering national security . . ."

UAL fights Qantas' bid for U.S. business

United Air Lines has warned Civil Aeronautics Board against any hasty action that would allow Qantas Empire Airways to carry San Francisco-New York traffic. The problem was raised when Qantas filed a petition with the Board requesting interpretation of so-called "cabotage provisions" under the Civil Aeronautics Act.

The petition specifically urged CAB to decide whether Qantas, as an Australian airline, has the authority to carry a passenger between San Francisco and New York (1) when the passenger is transferred to another carrier at New York for further foreign air transportation, or (2) when a passenger bound for New York boards a Qantas flight in San Francisco after foreign air transportation.

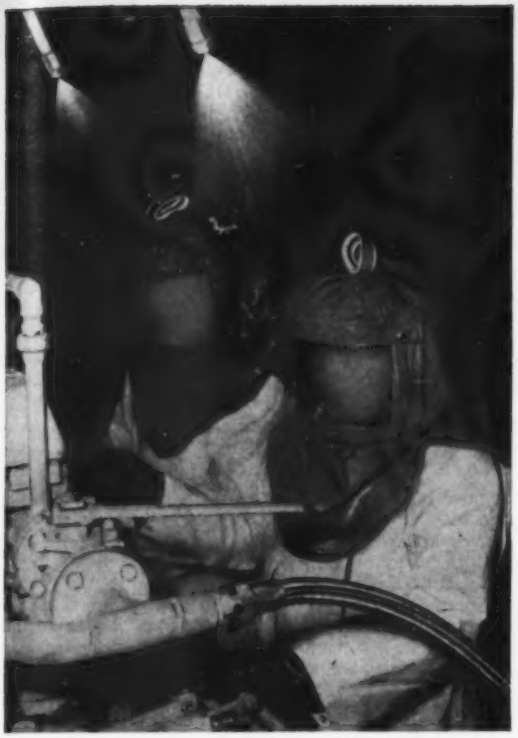
President appoints board in IAM-airlines dispute

A significant development on the sizzling airline-labor front took place when President Eisenhower stepped in to avert possible strike action by the International Assn. of Machinists against seven major airlines.

Appointed to a presidential fact-finding board to investigate the disputes were Howard A. Johnson, Butte, Mont. attorney; Paul N. Guthrie, University of North Carolina economics professor, and Francis J. Robertson, a Washington attorney. Johnson was appointed chairman of the group.

The board is slated to attempt settlement of a wage and rules-change dispute between the IAM and the following airlines: Eastern, Trans World, United, Northwest, Northeast, Capital and National Airlines. The board must report its findings by March 27 and no strike action can be taken for 30 days following that.

White House intervention was requested by the National Mediation Board after efforts to resolve the difficulties had failed and a major stoppage of the nation's air transport system appeared imminent.



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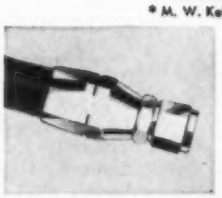

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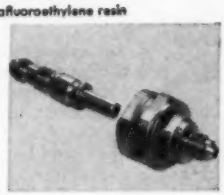

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WEST COAST TALK

by Fred S. Hunter

Turbofan idea still has possibilities for airlines; Electra impressive in flight demonstrations

WE WERE TALKING, not long ago, to an airline engineer who was bemoaning the lack of a turbofan engine suitable for jet transport power. "A ducted fan would drive the turbojets right out of the air," he observed. "But what engine maker is going to spend the $50 or $60 million it would take to develop one?"

There was a brief period when the Air Force, which has the money, had its eye on a turbofan development. It was aimed at the WS-110A, now North American Aviation's B-70. That's when the WS-110A system was to have been split, part subsonic, part supersonic. Since then it's gone supersonic all the way, and that change spelled the end of the turbofan idea for the military. The turbofan is applicable only in the subsonic speed ranges.

For the airlines, fuel economy is the turbofan's big attraction. A specifically designed turbofan should come up with approximately 20% better specific fuel consumption than a turbojet. But since a new engine costs so much to develop, the engine manufacturers are turning to the conversion of existing powerplants. General Electric's X220, which Convair hopes will put new punch in its 880 sales program, is a modification of the J79, in which one stage of the turbine is used to suck air around the shell of the engine in a duct. It would improve the J79's specifics by 10%. And now Pratt & Whitney has come along with a proposal for a turbofan modification of the J57, which has Boeing and Douglas looking into turbofan versions of the former's 720 and the latter's DC-9.

We're hearing more and more talk that Lockheed has a solid machine in the Electra, and that, as flight demonstrations continue, the propjet transport will become its own best salesman. Lockheed's test pilots have been making some impressive two-engine out demonstrations recently. The flight demonstration Lockheed staged for Eastern Air Lines directors on their recent Burbank visit was in the form of a simulated New York-Philadelphia EAL schedule. Test Pilot Herman Salmon flew the plane to Santa Barbara and back in 29 minutes, making the turn at Santa Barbara at 20,000 ft. after executing the climb at 4,000 ft. per min. Pilot Salmon likes to boast that the Electra, a transport, climbs faster than the wartime P-38 fighter did, and Herman used to think the P-38 was quite a climber.

More than 125 military pilots now have qualified in Lockheed's F-104A Starfighter.

Transport briefs

Alitalia has placed orders for four Douglas DC-8 jet transports following the visit here of a jet transport evaluation team representing the carrier and the Italian government. The Italian airline previously had options on four DC-8s and four Boeing 707s.

Riddle Airlines has been authorized by Civil Aeronautics Board to suspend cargo operations at five major cities for one year. Cities affected will be Boston, Cleveland, Cincinnati, Jacksonville and Philadelphia. Riddle had claimed that freight traffic at the five points "did not justify the cost of providing the service."

International Air Transport Assn. has issued a new and extended world airlines code for handling special cargoes, including radioactive materials. *Regulations Relating to the Carriage of Restricted Articles by Air* was effective March 15 and is available through IATA Traffic Dept., 1060 University St., Montreal 3, Canada. Cost: $3.50.

British European Airways and Aeroflot have signed a reciprocal air agreement for services between London and Moscow to become effective this summer, no later than September. BEA will use Viscounts at first, switching later to Comet IVs when they become available. Aeroflot would use the TU-104 or the slower IL-18 turboprop if London Airport noise restrictions prevent the use of the TU-104.

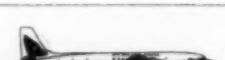
Air Line Pilots Assn. has refunded $106,000 in dues to its members. Individuals will receive between $3.13 to $19.52. Refunds amount to 5.22% of the dues paid by each member last year. Refunds last year amounted to $314,000 or 17% of the dues collected during 1956. ALPA returns to its members in dividends anything which would raise its net worth above $2.5 million.

Mohawk Airlines has sold two of its DC-3s; one to North Central Airlines and one to General Precision Equipment Corp. GPE bought theirs after a contract expired under which it operated the aircraft as a "flying test bed" for developing and testing electronic and navigational flight equipment.

Trans Pacific Airlines has asked Civil Aeronautics Board to put it on a $35,000-a-month subsidy. Carrier, in asking for immediate issuance of a temporary mail rate order, cited poor economic conditions and competitive factors that made the request necessary. TPA has been off subsidy since April 1, 1957.

Port of New York Authority has agreed to limited demonstration flights of the de Havilland Comet IV jet transport or its prototype at New York International Airport. Permission was based on acoustical engineers' noise level measurements made at the invitation of the manufacturer. An earlier model of the Comet without noise suppressors was refused permission to use Idlewild in 1951.

THIS SUMMER... DC-6B's TO ETHIOPIA,



"Land of the Queen of Sheba"

DC-6B Speed and Luxury will be available between Europe and East African cities in mid-1958. Ethiopia, Land of Sheba, rich in antiquity but with modern comforts, offers an exotic never-to-be-forgotten holiday.

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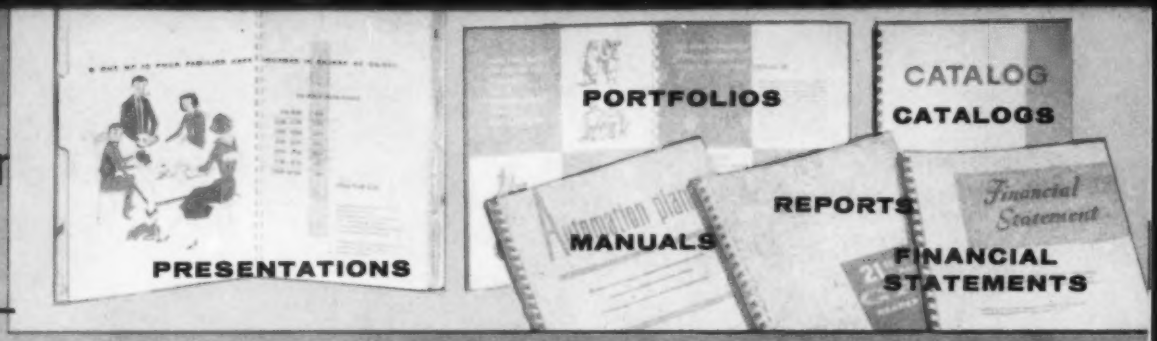

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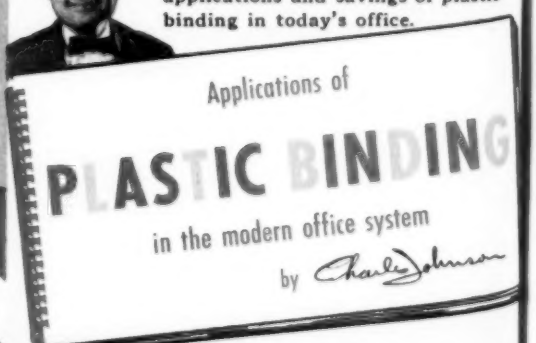

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TRANSPORT TRENDS

February was not a good month for domestic trunklines. Passenger-miles were only 1.6% ahead of same month last year. Load factor was down (to 56.14%) for seventh consecutive month. Bad weather in Florida and northeast was partially responsible for poor showing. Traffic of all major lines serving Florida was substantially below last year. Another reason: coach load factors were off considerably for most trunks. Coach dropped 3.46 percentage points, first-class was down 2.46.

Don't look for decision in CAB's general passenger fare investigation until 1959, now that Board has refused to speed up the proceeding. Meanwhile, another interim fare boost remains a possibility.

A drive is gaining momentum in House Ways and Means Committee to eliminate the 3% transportation tax on freight. Move would cost the government nearly half a billion dollars in estimated new revenue. But elimination of the freight levy is considered more likely than dropping the 10% passenger tax.

Transatlantic airlines now have the green light to start "economy" class service Apr. 1. CAB finally okayed the fare—$252 one-way New York-London, or $38 cheaper than present tourist class. Also on Apr. 1 the one-way first-class fare increases $35 to $435, tourist is up $25 to $315, 15-day $425 roundtrip excursion is dropped. Some foreign airlines are still burned up because CAB waited until two weeks before effective date to approve fares. For months they and U.S. lines have spent thousands of dollars advertising economy class. Last-minute disapproval would have been disastrous.

Domestic airlines are pleased with results of no-show control plan. Since mid-1956, when plan's first phase became effective, no-shows have dropped 56% on first-class flights, 55% on coach. Plan includes ticket time limits, reconfirmation, penalty.

Airlines weren't interested in USAF offer to rent them Boeing B-47s for jet crew training. Some carriers had made a pitch to get KC-135 tankers; USAF said they weren't available, offered B-47s instead. However, the B-47 is substantially different than commercial jet, wouldn't do airlines much good.

Boeing is giving more attention to its Model 727 short-range jet-liner project. Engineers have worked up several different twin-jet and four-jet proposals. But there's been no decision on a single configuration suitable for prototype construction. Boeing is talking to airlines about the 727, but admits frankly that it's still a "paper" airplane.

Japan wants civil air talks with U.S. Purpose: to get rights for Japan Air Lines at Los Angeles, in addition to present San Francisco stop. Meanwhile, U.S.-Spanish talks have been suspended. Spain was insisting on imposing capacity restrictions on U.S. lines.

IATA will experiment this year with new plan to speed traffic conference sessions. It will hold two short meetings (in Caribbean in May for nonpolicy matters, in southern France in September for fares, rates and policy) instead of one long one. If successful, plan will please airline executives who have complained for years about amount of time their representatives are required to spend at traffic conferences.

Twin problems associated with the fast-approaching jet transport era and rising unemployment are sparking a congressional drive for increased airport aid funds. Bipartisan appeals for an immediate extra $75 million to match local funds already available is getting Senate attention. A second proposal by members of the Senate Commerce Committee to hike annual airport aid spending to $100 million won important endorsement from Majority Leader Lyndon Johnson—leader of the Senate's antirecession fight.

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TRANSPORT At Deadline

Exclusive

Turboprops eclipse piston reliability, promise lower cost

Turboprop transports now in commercial operation and military counterparts logging thousands of engine hours of pre-airline service experience show promise of "rewriting the book" of engine reliability.

In direct contradiction of U.S. military apprehensions 10 years ago as to the reliability prospects of turboprops, current installations are outshining their piston engine predecessors in virtually every phase of reliability.

Probably the best example is the Rolls-Royce Dart which is well into its third year of day-to-day operation in the U.S. on Capital Airlines Viscounts.

Recent statistics compiled by CAA's Office of Flight Operations and Airworthiness for a 90-day period show that the Dart has flown an average of 14,652 hours per failure, at least double the time recorded by an airline using the most modern piston engine.

In many instances, the improvement was four or five-fold in favor of the turboprop. In one specific instance, the Dart's 14,652 hrs. average was almost 12 times that of the 1,241 hrs. averaged by an airline operating Douglas DC-7Cs.

And the Dart apparently is no exception. During a recent tour of South American countries with a Lockheed C-130 military turboprop, the entire 16,000-mile journey was completed without a mechanical flight delay, without spare parts support, and without removing the engine cowling.

The turboprop reliability record on the Viscount is little short of phenomenal. In some 190,000 hours of engine operation, only 7% of removals were failures, 29% were replaced for repair and reinstallation and 63% for routine overhaul.

In only eight instances out of 54 examples of airline piston engine operation was the Dart's average of 7,936 hrs. per propeller feathering surpassed. Capital feathered a propeller 24 times in the 90-day period, the equivalent of one about every four days.

By way of contrast, even airline DC-6 operations show an average of about 50% of engines removed for routine overhaul, about 15 to 20% for failure and the balance for repair. Propeller featherings for eight carriers numbered 169 and occurred once every 3,500 hrs. of operation, more than twice the frequency of Dart featherings.

True, the record of the turboprop is not all pure, and in some instances, engines have been at the root of the problem. However, in virtually all such cases, the nature of the trouble has been such as to involve basic design factors that would have to be corrected at the expense of the manufacturer before scheduled airline service.

CAB refuses to speed fare investigation

Civil Aeronautics Board has refused any speed-up of its General Passenger Fare Investigation. At the same time, the Board did not rule out the possibility of another interim passenger fare increase.

Commenting on American Airlines' motion urging expeditious treatment of the case, CAB said "The Administrative Procedure Act permits us to dispense with an initial or tentative decision only where the due and timely execution of our functions imperatively and unavoidably so requires."

"We cannot make such a finding when the emergency relief American seeks is otherwise available."

American, supported by Continental, Eastern and Western airlines, had asked the Board last January for "immediate action" in the fare case. AA argued that the proceeding could be accelerated in a manner "entirely consistent with the due process and fair hearing procedure."

Three airlines, United, TWA and Braniff, opposed the AA move. To eliminate any examiner's decision, CAB argued, would unnecessarily deprive these carriers of a method of procedure normally deemed essential to a full and complete hearing.

The Board will now continue with normal procedural steps in what it describes as "the first general passenger fare investigation to proceed to hearing in the 20-year history of the Act."

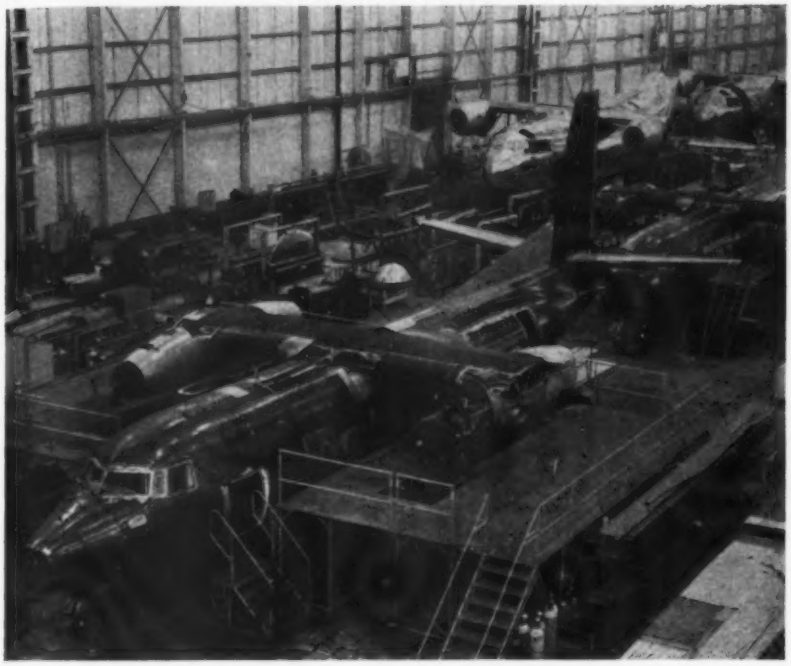
SWA gets new name

It's official now—Southwest Airways' new name is Pacific Air Lines. CAB reissued SWA's local service airline certificate to reflect the new name after the carrier complied with certain Board conditions, such as proof of change of corporate papers, etc.

Prototype Dart Herald nears first flight

DART HERALD turboprop feederliner has been rolled out at Handley Page's Woodley (England) assembly hangar. Powerplants are two Rolls-Royce Darts. New airliner can carry 43 passengers 700 miles at 275 mph. First flight is expected shortly. Dart Herald is development of piston-engined Herald "branchliner," which has been flying since 1955.

First Fairchild Friendship near rollout



FAIRCHILD F-27 Friendship turboprop transports are nearing completion at the company's Hagerstown, Md., plant. Company has firm orders for 66, options for another 27 from 13 airlines and 15 corporations. Executive transport models will be custom fitted. Rollout was scheduled by end of March.

Independents blast Defense directive on seating in military charter planes

Recent Dept. of Defense directive prescribing minimum standards for seating in military charter aircraft brought sharp criticism from the Independent Airlines Assn. IAA charged that in effect this was "an attempt to make the railroads more competitive" in the market for military charter traffic.

New requirement is that minimum width of seats, measured armrest to armrest, be 16½ in.; each armrest be no less than 2 in. wide; minimum longitudinal spacing between rows of seats, measured center to center, be 35 in., and minimum shin-room underneath the seat, measured perpendicular to the floor, to be 9 in.

Military Traffic Management Agency, source of the directive, replied that discrimination was not intended, but that since Uncle Sam pays for first-class transportation, he should get it. The requirement, MTMA said, was instituted primarily to ensure that military passengers get reasonably comfortable accommodations.

Previously, DOD had cancelled another directive that prescribed load limitations, which commercial operators fought for some time. New directive, it appeared, was intended to fill the gap left by removal of load limitations.

The independents took exception to this, however. They said the directive gives the military traveller "a very fancy position compared to the American public." Aircoach travel should be satisfactory to the travelling G.I., said one industry official, "and I know a lot of millionaires who ride it," he continued.

C-46 and DC-3 owners were expected to be most seriously hit by the new directive. Seats in most of these aircraft, which are active in military charter operations, are permanently installed.

It is both costly and time-consuming to rearrange them. High cost of new seats and 60-90 day time-lag in putting them in placed a sudden and serious economic burden upon them, said industry officials. Directive came out March 5 and was to be effective March 8.

Dept. of Defense, a few days later, agreed to defer implementation of the directive for at least two weeks. DOD officials said the directive was being studied.

Action by DOD evoked the praise of one IAA spokesman for what he called "this very fair and reasonable action" in allowing the industry more time to investigate possible effects of the new directive.

Examiner backs Continental for Dallas-West Coast

A major route from Dallas to Los Angeles and San Francisco has been recommended for Continental Air Lines by CAB Examiner Thomas L. Wrenn.

The route, which would compete with American Airlines, would operate Dallas-Ft. Worth-Lubbock-El Paso-Albuquerque-Phoenix and (a) beyond Phoenix via Las Vagas to San Francisco/Oakland and (b) beyond Phoenix via San Diego to Los Angeles.

Conditions in the certificate would include: (1) mail must be carried on a nonsubsidy basis, (2) flights serving any California point must also serve Dallas or Ft. Worth, (3) no local passengers between San Diego-Las Vagas, Phoenix-Las Vegas and Phoenix-Albuquerque, (4) no through-plane service from Denver to Dallas, Ft. Worth, Phoenix and Las Vegas.

American was recommended for extension of its Dallas/Ft. Worth-Los Angeles route to San Francisco/Oakland without local traffic rights from San Francisco to Los Angeles or San Diego.

Trans-Texas Airways would be granted nonstop Dallas/Ft. Worth-San Angelo service, and Continental would receive nonstop rights from Dallas/Ft. Worth to Midland-Odessa, Amarillo and Abilene, all in Texas.

Wrenn said that CAB's "more liberal new route policy" justifies the new Dallas-West Coast service, and that its policy of "strengthening the less favorably endowed carriers" dictates the award to CAL.

In 1955 and 1956, CAB in four major cases "practically redrew the basic route structure of many of the domestic trunkline carriers," authorizing competitive service between 264 pairs of points, he said. "The evidence herein shows that the origin-destination traffic in 1955 between Dallas and the points with which it now seeks first effective competitive service exceeded in each case the traffic reported on 50% or more of the foregoing 264 pairs of points . . .

"The evidence also shows that the Dallas-Los Angeles segment alone is the strongest noncompetitive segment in the country and that the Dallas-San Francisco/Oakland segment ranks third . . ."

AA's present service on the route is not inadequate, but "the argument that competitive service should not be instituted unless the existing service is shown inadequate and the existing carrier is unable or unwilling to render adequate service has been rejected by the Board."

"This case," Wrenn added, "offers the Board an opportunity to decrease the gap in size between Continental and its chief competitors and to widen the rather narrow margin between its recently acquired self-sufficiency status and that requiring subsidy . . .

"Selection of Continental will pro-

vide it and the Board an opportunity to review local service operations in the region Continental serves and transfer local service points to local service carriers operating in the region." CAL now operates local service routes taken over in the merger with Pioneer Air Lines.

CAB's Bureau of Air Operations had favored National Airlines for the Dallas-West Coast route, but Wrenn said that granting it to NAL or Eastern "would involve more than 2,000 new route miles separated from each carrier's existing system by the 250-mile distance between Houston and Dallas. . . . Each would be required to operate a completely disconnected route involving ferry mileage over the open gap."

The real interest of NAL and EAL in a Dallas-West Coast route "is that it provides what they conceive to be an important link in a southern transcontinental route," Wrenn claimed.

Why General Dynamics backed Capital

General Dynamics' action in sponsoring a refunding of Capital's existing debt and affording convenient terms for that carrier's purchase of Convair 880s was taken with long-range objectives in view, according to informed sources.

Prior to the Capital order for nine Convair 880s (plus six on option) General Dynamics had orders from only two U.S. carriers (TWA and Delta) for a total of 40 aircraft. The Capital action places a third U.S. airline in the 880 program, adding to the general acceptance of this aircraft. Moreover, with the addition of the Capital order, Convair is placed that much closer to the break-even point on the 880 program.

Thus, even if General Dynamics should incur a small loss in its Capital financing arrangements, it will be a small price to pay for the major benefits to be achieved.

The endorsement of airline "paper" by aircraft manufacturers is not new. Capital's notes in financing the acquisition of 049s, for example, were endorsed by Lockheed many years ago.

Hector urges incentive base in local mail rates

Drastic overhaul of CAB's local service mail rate standards and procedures has been called for by CAB Member Louis J. Hector.

CAB, he said, should provide the locals with "genuine profit incentives . . . to increase their earnings and efficiency . . . "

In a statement in the Mohawk Airlines mail rate case, Hector urged CAB to "construct a set of mail rate standards and procedures whereby the detailed decisions as to the kind and amount of services to be offered could in most cases be removed from the area of detailed government regulation and returned to the area of private business decision."

An incentive formula would enable locals to "judge for themselves, within the simple, clear standards of profit and loss, whether to expand service or improve its quality . . .

"I realize that there may be special circumstances where an incentive formula will not work. It may always be necessary, for instance, to direct service in remote and sparsely settled areas at a cost to the government in excess of an incentive rate . . . Indeed, the Board might find it expedient in such cases, or in new air transportation experiments such as the helicopter operations, to proceed on some sort of fixed-fee contract basis so that both the government and the carrier will know exactly how much subsidy to expect."

Hector was critical of the Board for failing to decide, in the many Mohawk rate orders since 1955, whether it would underwrite operation by the company of a mixed fleet of Convairs and DC-3s.

BRIEFS

Western Air Lines will equip its fleet of Lockheed Electra turboprops with X-band type Bendix RDR-1 weather radar, MKA-7A marker beacon receivers and LPA-70C flush-loop antennas. The RDR-1 radar has ability to locate and identify storm areas up to 150 miles ahead.

KLM Royal Dutch Airlines, Fokker Aircraft and Lufthansa Airlines have ordered Bendix electronic and navigational equipment for turbine airliners. KLM has ordered 12 Lockheed Electras; Lufthansa, four Boeing 707s, and Fokker will include the equipment on three F-27 Friendships.

Hilton Hotels Corp. will build a chain of 300-unit inns adjacent to airports of leading cities. Hilton already has leased a site near San Francisco International Airport and is negotiating for land near Los Angeles International. Other prospective sites are at Boston, Washington, New York, Chicago, Detroit, New Orleans, Miami and Seattle.

Port of New York Authority's preliminary evaluation of the Boeing 707 sound suppressor system has begun. First demonstrations were held recently at Seattle. Further tests will be held at Boeing Field and at Edwards AFB.

Trans World Airlines has sold six Douglas DC-4 cargo planes to Eastern Aircraft Corp., Hackensack, N.J., at an undisclosed price. Planes will be flown to Burbank for refurbishing by Pacific Airmotive Corp. Eastern plans to use some of the aircraft on a newly organized German airline known as Aerotour.

Douglas DC-3 passenger aircraft using Airstair doors must be modified under a Civil Aeronautics Administration airworthiness directive. Compliance date is July 1.

Self-propelled jet starter with new approach

AIR-TORQ pneumatic ground starter by Pre-Flite Industries, Inc., Paramount, Calif., supplies starting air from a storage tank filled by a compressor driven by the same gasoline engine used to propel the vehicle. Shown with Eastern Air Lines emblem, first starter has been delivered to Lockheed Aircraft Corp. for demonstration with the Electra. Company says storage tank, holding enough air for four engine starts, can be recharged in 15 minutes. Unit is capable of starting gas turbine engines equipped with air turbine or air impingement starters and can be supplied with a 70-KVA alternator for ground power supply.

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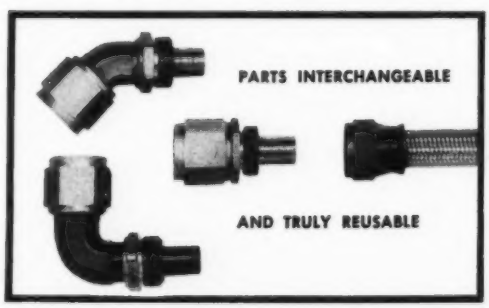

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LETTERS

On Decca, Dectra and Loran

To the Editor:

An article appeared in AMERICAN AVIATION of Feb. 10, in which certain aspects of the Decca and Dectra systems of navigation were compared with Loran.

Standard Decca is a high-accuracy, medium-range system which provides the pilot with a pictorial presentation, giving him his position continuously. The range of the system varies from 240 nautical miles at night to several hundred miles (500-800) by day. In comparison, the Loran system requires an operator to take fixes which must then be transferred to a chart before they mean anything. The time required to perform this position-fixing function makes the system virtually useless for the accurate navigation required along congested airways and in terminal areas.

The article fails to state that Loran is primarily an overwater aid and has an overland range of the order of 200 nautical miles, and this with degraded accuracy.

With respect to the statement attributed to the Coast Guard regarding the respective Loran and Dectra coverages, I must point out that there are at least six Loran stations in the North Atlantic and these six stations do not provide adequate coverage in the North Atlantic area. The accuracy in much of the area is less than that recommended by ICAO for long-range navigation. The Azores and Lisbon have no Loran coverage at all.

The Dectra North Atlantic area coverage system uses only two stations in Newfoundland (which are also the Master and Purple Station of the Standard Decca Gander Chain) and one station in Scotland. . . . Scheduled transatlantic air carriers have already navigated on Dectra between Lisbon, the Azores and Gander, as well as via Iceland with an accuracy far exceeding that of any long-range navigational aid available heretofore.

The interchangeability between the Decca and Dectra equipment and presentation provides transition from long-range Dectra to the extremely high accuracy of Decca in the terminal areas.

The Decca/Dectra system is *not* one of the systems "just around the corner," as mentioned in your article. It is in operation today. *THOMAS D. JOHNSON, vice president, Decca Navigator System, Inc., New York, N.Y.*

To the Editor:

We, at Edo, were very pleased to read the fine article on Loran in your Feb. 10 issue, written by Henry P. Steier.

We feel that this was particularly well handled by Mr. Steier in obtaining the story from the Coast Guard, and in presenting a rather complicated situation in such a concise manner. *A. M. BROWN, Edo Corporation, L. I., New York.*

Praise Army Aviation issue

To the Editor:

I was gratified to see the excellent job you have done in the first Army Aviation issue of your magazine. Your editorial will certainly be a source of many lively discussions—and that is what we need.

In behalf of the Army aviators I wish to express my appreciation for the complete, factual coverage which you have given to our efforts to provide the Army with the mobility and other characteristics which make aviation such a vital part of modern land combat. *ERNEST F. EASTERBROOK, Brig. Gen., Director, Army Aviation, Washington, D.C.*

To the Editor:

I want to take this opportunity to compliment you and your staff on the very splendid edition just received dealing with Army Aviation.

It is very timely and I am sure will be an immensely useful review to many. *CHARLES A. PARKER, National Aviation Trades Association, Washington 6.*

Liked treatment of statistics

To the Editor:

The treatment given by AMERICAN AVIATION to the statistics I got together for our meeting in Detroit will certainly be very popular with our members, I know.

This is the first time that we have ever gone into such a tabulation and I have had favorable comments on the Dec. 30 story . . . *THOMAS A. FERNLEY, JR., Managing Director, Aviation Distributors and Manufacturers Assn., Philadelphia.*

Liked purchasing story

To the Editor:

Congratulations on the excellent article on punch-card purchasing in the Jan. 27 issue. Nothing but compliments so far. Would appreciate a couple of copies if you have any spares. *W. F. BALDWIN, Staff Assistant, Purchasing & Stores, United Air Lines, Chicago.*

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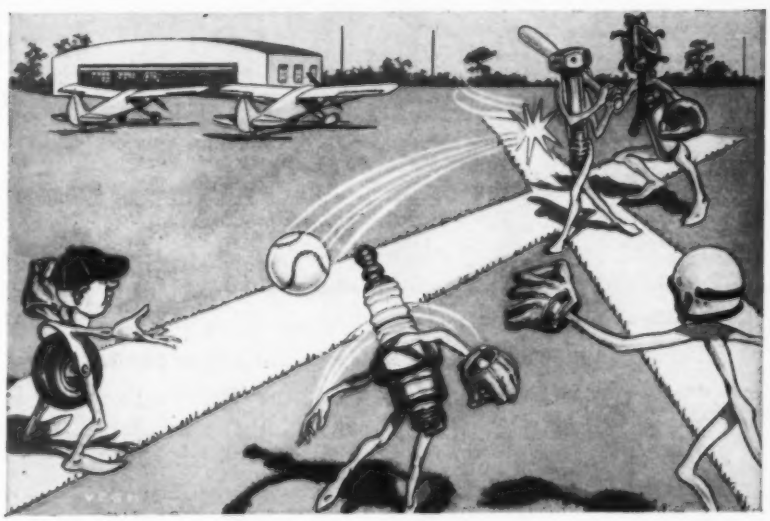

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Circle No. 25 on Reader Service Card.

Summary of U.S. airline traffic for January 1958 vs. January 1957

Compiled by American Aviation Publications from Official CAB Data

Airlines	Passengers Originated			Revenue Passenger Miles (In Thousands)			Total Ton-Miles Rev. Traffic			% Available Ton-Miles Used	
	1958	1957	% Change	1958	1957	% Change	1958	1957	% Change	1958	1957
DOMESTIC											
American	601,263	574,661	4.6	402,723	400,426	0.6	47,674,569	47,612,530	0.1	54.5	59.0
Braniff	173,873	157,896	10.1	76,586	67,882	12.8	8,215,795	7,178,762	14.4	46.3	47.3
Capital	331,455	266,506	24.4	130,100	96,514	32.1	13,488,041	10,139,335	33.0	46.8	46.5
Continental	69,132	60,828	13.7	31,971	22,695	40.9	3,354,606	2,373,777	41.3	44.5	45.9
Delta	230,479	215,716	6.8	119,785	111,051	7.9	13,096,737	11,897,506	10.1	51.0	52.8
Eastern	656,063	608,588	7.8	394,749	376,887	4.7	40,470,323	39,073,303	3.6	50.7	42.3
National	143,589	138,261	3.9	102,159	98,779	3.4	10,880,199	10,472,985	3.9	48.0	49.5
Northeast	61,943	37,238	66.3	34,994	8,748	300.0	3,574,596	883,757	304.5	37.8	38.6
Northwest	110,619	93,612	18.2	73,091	64,512	13.3	8,295,699	7,403,375	12.1	45.9	48.1
Trans World	361,497	330,283	9.5	295,661	264,966	11.6	31,702,451	29,135,415	8.8	53.0	55.7
United	487,998	485,747	0.5	352,532	334,239	5.5	41,461,218	39,590,104	4.7	54.5	55.0
Western	117,748	103,598	13.7	62,499	51,556	21.2	6,543,572	5,455,722	19.9	47.8	58.3
TOTALS	3,345,659	3,072,934	8.9	2,076,850	1,900,255	9.3	228,757,806	211,216,571	8.3	51.2	51.5
INTERNATIONAL											
American	10,715	11,181	-4.2	9,371	9,277	1.0	1,281,483	1,274,123	0.6	61.8	69.9
Braniff	3,910	2,771	41.1	7,767	6,064	28.1	974,883	794,090	22.8	44.3	54.9
Delta	6,496	5,663	14.7	7,507	6,475	15.9	877,640	773,677	13.4	55.8	59.2
Eastern											
San Juan	24,728			35,434			3,808,390			71.4	
Bermuda	1,544	23,415	27.2	1,212	31,670	33.1	129,352	3,427,624	33.2	30.2	59.9
Mexico	3,521			5,496			627,756			48.6	
National	11,012	9,691	13.6	7,636	6,340	20.4	876,788	704,222	24.5	45.5	53.0
Northwest	8,382	8,212	2.1	19,474	18,076	7.7	3,530,601	3,437,615	2.7	55.5	60.3
Hawaiian	1,332	1,433	-7.0	4,117	3,838	7.3	453,674	424,004	7.1	60.0	64.1
Panagra	11,073	11,464	-3.4	13,687	14,048	-2.6	1,948,276	1,822,823	6.9	56.2	57.4
Pan American											
Latin America	102,268	108,852	-6.0	108,104	101,307	6.7	14,981,009	13,619,405	10.1	63.1	62.1
Atlantic	65,438	58,747	11.4	81,622	78,518	4.1	11,984,040	11,561,167	3.7	51.5	56.3
Pacific	19,628	20,524	-4.4	70,538	76,183	-7.4	9,620,588	10,575,023	-9.0	55.1	63.2
PDX/SEA-HON	1,899	2,210	-14.1	5,251	6,406	-18.0	555,820	679,536	-18.2	47.2	55.8
Alaska	2,801	4,437	-36.9	3,358	5,047	-33.5	540,241	719,521	-24.9	51.4	43.7
Trans World	15,876	12,765	24.4	44,588	33,563	32.8	6,131,941	5,083,753	20.6	50.9	63.8
United	6,632	6,403	3.6	16,478	15,897	3.7	1,849,484	1,768,460	4.6	52.1	40.2
Western	2,115	.....	...	3,289	.....	...	362,354	.....	...	63.8	...
TOTALS	296,139	284,125	4.2	435,561	402,465	8.2	59,524,826	55,561,503	7.1	56.1	59.9
LOCAL SERVICE											
Allegheny	32,832	26,393	24.4	5,568	4,477	24.4	566,945	459,844	23.3	40.3	39.4
Bonanza	14,847	10,982	35.2	3,416	2,496	36.9	340,068	252,042	34.9	42.5	45.2
Central	10,255	6,776	51.3	2,107	1,407	49.8	215,101	146,156	47.2	30.6	24.9
Frontier	17,871	15,871	12.6	4,851	4,618	5.1	538,871	513,289	5.1	56.9	55.5
Lake Central	14,194	10,604	33.9	2,260	1,726	30.9	232,218	179,024	29.7	38.4	38.9
Mohawk	30,490	28,324	7.6	5,708	5,329	7.1	577,377	537,118	7.5	48.6	49.4
North Central	55,341	46,725	18.4	9,008	7,350	22.6	913,324	752,111	21.4	44.1	46.3
Ozark	31,999	25,356	26.2	5,195	3,889	33.6	531,392	406,915	30.6	43.8	37.8
Piedmont	30,696	26,006	18.0	6,318	5,481	15.3	636,380	558,277	14.1	46.2	47.4
Southern	17,462	16,023	9.1	3,173	2,808	13.1	324,844	287,863	12.8	36.3	40.4
Southwest	26,446	23,532	12.4	5,746	5,101	12.6	566,179	506,865	11.7	45.2	45.7
Trans-Texas	19,547	17,402	12.3	4,457	3,994	11.6	472,659	423,078	11.7	38.3	38.3
West Coast	19,063	16,516	15.5	3,495	2,959	18.1	343,397	291,640	17.7	42.9	39.5
TOTALS	321,063	270,510	18.7	61,302	51,635	18.7	6,258,755	5,314,222	17.7	43.2	47.4
ALASKAN SERVICE											
Alaska (States	489			760			181,886			31.3	
Intra)	3,977	3,996	11.8	1,133	1,665	13.7	241,552	481,204	-12.0	46.0	40.1
Alaska Coastal	2,746	2,676	2.6	258	239	7.9	33,263	30,743	8.2	65.0	62.7
Cordova	772	695	11.1	98	98	0.0	20,066	37,642	-46.7	39.8	46.0
Ellis	2,918	3,132	-6.8	179	188	-4.8	21,513	22,534	-4.5	67.4	64.4
No. Consolidated	1,059	1,121	-5.5	339	400	-15.3	94,226	176,480	-46.6	57.9	58.7
Pacific Northern	6,674	5,912	12.9	5,952	5,482	8.5	934,706	812,449	15.0	50.5	49.3
Reeve	364	214	70.1	261	188	38.8	109,095	44,445	145.5	41.9	70.2
Wien Alaska	1,087	1,502	-27.6	331	581	-43.0	172,006	463,256	-62.9	54.4	83.7
TOTALS	20,086	19,248	4.4	9,311	8,841	5.3	1,808,313	2,068,753	-12.6	47.2	52.7
HELICOPTER SERVICE											
Chi. Helicopter	6,321	.....	...	109	17	541.1	11,972	3,944	203.5	28.0	34.2
Los Angeles Airways	2,243	2,080	7.8	88	83	6.0	13,878	14,275	-2.8	55.4	50.2
New York Airways	4,753	3,960	20.0	92	76	21.5	11,540	9,842	17.3	35.3	39.7
TOTALS	13,317	6,040	120.5	289	176	59.7	37,390	28,061	33.2	37.2	43.3
TERRITORIAL SERVICE											
Caribair	21,411	20,112	6.5	1,504	1,467	2.5	162,879	159,081	2.4	63.2	57.9
Hawaiian	28,874	29,378	-1.7	4,176	4,505	-7.3	446,728	494,350	-9.6	52.9	55.3
Trans Pacific	12,718	NA	...	1,662	NA	...	139,947	NA	...	51.0	NA
TOTALS	63,003	49,490	27.3	7,342	5,972	22.9	749,554	653,431	14.7	54.4	55.9

N. A.—Not available.

NOTE: Northwest Hawaiian and PAA Honolulu figures are shown for information only; individual carrier totals include these figures.

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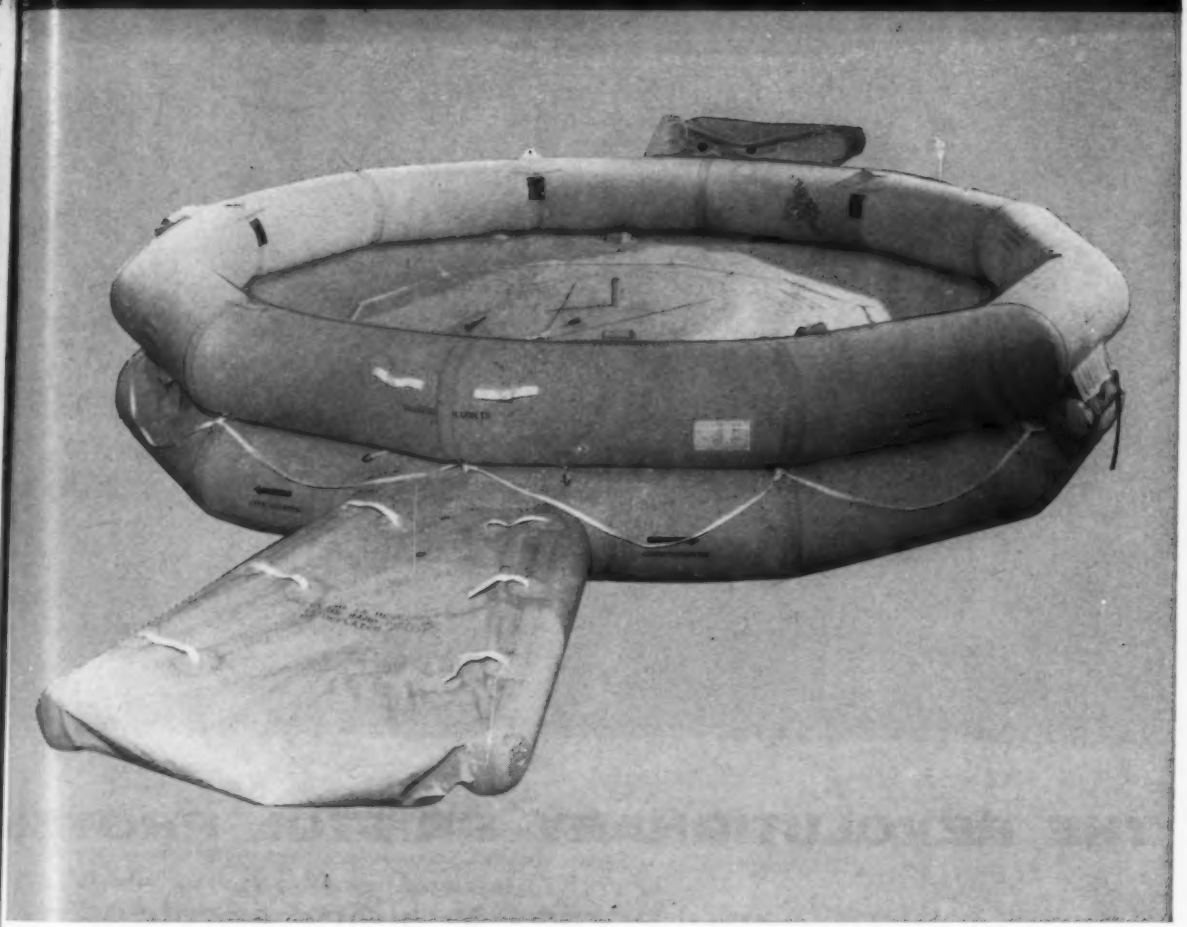

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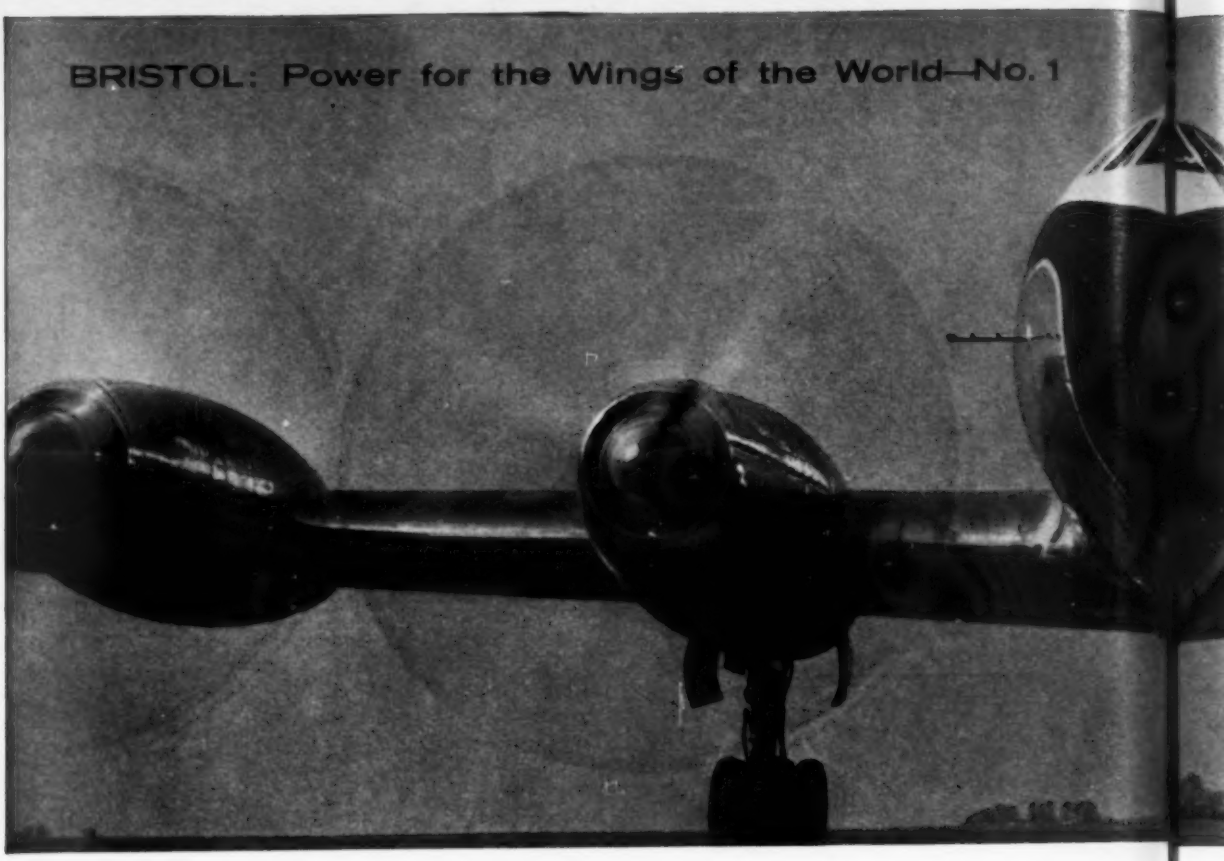

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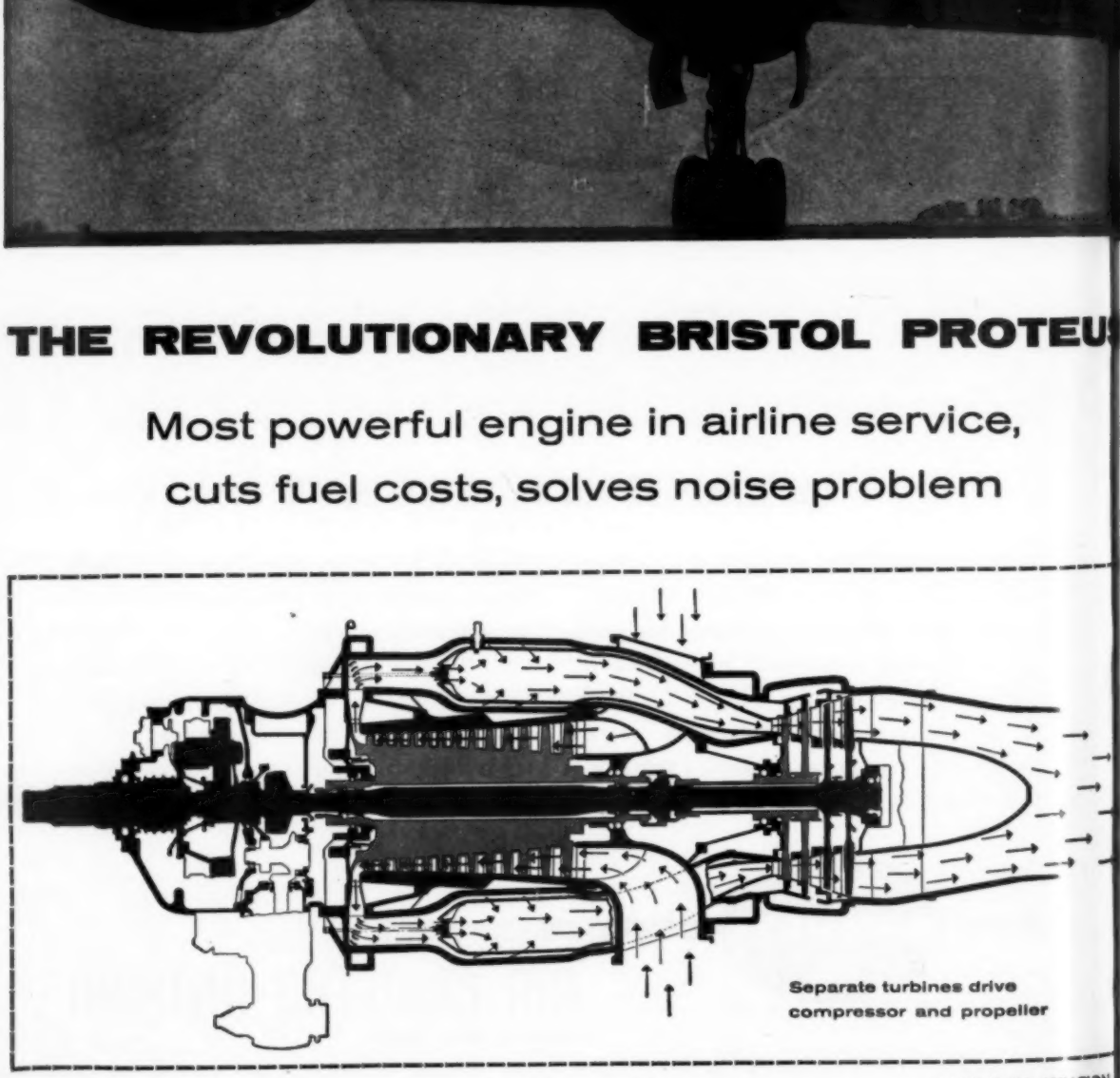

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PEOPLE

CHINLUND

MARTIN

Edwin F. Chinlund appointed 1958 board chairman of Scandinavian Airlines System. Chinlund, an R. H. Macy Co., Inc. executive from New York, will succeed **Berent Friele** in his new position.

George C. Martin promoted from gen. mgr. at Boeing Airplane Co.'s Seattle Div. to vp and gen. mgr.

J. A. Morley moves up from vp-sales and services, Avro Aircraft Services, Ltd. to pres. of the company.

E. B. Code, Tom Croson and **L. J. Hawkinson** appointed to new West Coast Airlines positions. Code, former vp-operations, is now vp-planning and engrg., Croson, former vp-sales becomes vp-community and pub. rel., and Hawkinson moves from sec'y.-comptroller to sec'y.-treas.

Samuel Agabian appointed vp-Sperry Gyroscope Co. Former position was mgr. Sperry's Air Armament Div.

Brig. Gen. Luther Stevens Smith becomes dir. pub. rel., Temco Aircraft Corp. He formerly was asst. to pres.

E. A. Bellande appointed vp-foreign operations and support services, The Garrett Corp. His former job was vp and vice chrm. of the board.

E. U. Da Parma, former Sperry Gyroscope Co. vp-operations, becomes exec. vp.

Henry W. Held moves up to vp-U.S. for Irish Airlines. He previously was U.S. traffic and sales mgr.

Max Stuart-Shaw appointed gen. mgr., Central African Airways. Prior position was asst. gen. mgr., Aer Lingus.

W. D. Dilworth is now dir.-traffic admin. and asst. sec'y., United Air Lines. He was mgr. traffic.

Larry Decker appointed gen. sales mgr., Bonanza Air Lines. Prior job was asst. to vp-traffic and sales.

Allan A. Barrie, former gen. mgr., Iranian Airways, is now dir. aircraft sales, American Airlines.

Paul E. Hovgard, former vp-Kellett Aircraft Corp., named asst. to pres. of Helio Aircraft Corp.

John W. Black promoted from asst. plant mgr., Tucson, Ariz., plant of Hughes Aircraft Co. to plant mgr.

M. Carl Haddon becomes Lockheed Aircraft Corp.'s dir. marketing, Calif. Div. Haddon's former position was chief engr. California Div. **Robert A. Bailey** becomes chief engineer and **Arthur E. Flock,** chief advanced systems research engineer.

HADDON

BAILEY

Roger W. Mullin, Jr. elected sec'y and **Frank H. Miller** treas., Curtiss-Wright Corp. Mullin has been with C-W since 1953, serving as asst. sec'y most recently. Miller joined C-W in 1934.

Correction

In the Feb. 24 issue of AMERICAN AVIATION, page 57, Maj. Gen. Albert Boyd (USAF ret.) and RAdm. Raymond J. Pflum (ret.) were incorrectly identified in their new positions. Gen. Boyd is now vp and gen. mgr. of Westinghouse Electric's defense products division, and Adm. Pflum is vp-sales for Napier Engines, Inc. AMERICAN AVIATION regrets the error.

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EN ROUTE

by Wayne W. Parrish

Tasmania: one of the best parts of Australia

ONE OF THE pleasant surprises of my trip to Australia was Tasmania, one of the states of the Commonwealth consisting of an island the size of Scotland and some smaller islands. It is off the southern coast of the mainland, not as far south on the globe as the southern tip of New Zealand or South America, but below the tip of the African Continent.

It is unlike the bulk of Australia in that it has a temperate climate, lots of forests and lakes and streams, and is quite a sportsmen's paradise. Much to my surprise a lot of the main island is undeveloped and some of it unexplored.

I flew down there in an Ansett Convair from Melbourne. Quite a bit of the flight was over water and then we stopped at a pleasant-looking town by the name of Launceston on the way to Hobart, the capital. The northern part is very pastoral.

Tasmanians are fiercely proud of their state. They could do a terrific tourist business if they so desired, but instead of that they like the place as it is and the tourist facilities are not too well developed. Wonderful place for fishing, and yachting and sailing.

Having spent three weeks around the mainland it was quite a change to see some lush, green country with rivers and gorges and rugged terrain.

Picturesque is word for Hobart

Let me chalk up a high mark for Hobart as being one of the most picturesque cities in the world. I don't suppose the population of the city and suburbs is more than 75,000 at most, so it isn't exactly fair to compare it with such spectacularly beautiful cities as Rio de Janeiro, Lisbon and San Francisco. But it could be compared with Bergen, Norway, or Wellington, N.Z., very easily.

Rising sharply from the city is Mt. Wellington, 4,000 feet. From the top is a superb view of the city, harbor, hundreds of islands and the rugged terrain of the southern part of the island.

I stayed at the Wrest Point Hotel, a semi-resort establishment on the outskirts of the city along the bay. But it was cold and uncomfortable when I was there, it being autumn "down under." The hotel had no central heating and a cold wind was blowing. Hobart is a summer resort for people from Sydney and Melbourne who want to escape from the heat. As a winter resort it needs some steam heat.

I hired a car after arrival to take a drive out in the country and found it very pleasant and relaxing. The town itself is on the sleepy side, but it boasts one of the nicest botanical gardens I've seen. They go for fine gardens in a big way in Australia.

By coincidence, Qantas Empire Airways, Australia's foreign flag line which now operates around the world, was showing off one of its new Super-G Constellations in Hobart while I was there, taking local people on courtesy hops and throwing a fine reception at my hotel. It was the first time a plane of this size had ever visited Tasmania and it was making a big hit with the local citizenry.

Qantas doesn't serve Tasmania but it was drumming up international business. But Hobart is served by several domestic carriers which do a thriving business because their only competition is a long and involved train and boat trip to the mainland.

To anyone going to Australia I would certainly recommend a visit to Hobart, even briefly. It is an attractive part of the world, even though hotel accommodations are modest.

Record hitch-hike hop

I snagged a free hitch on the Qantas Connie going back to Sydney on a Sunday night and we made the 567 miles in a new record time of two hours and one minute, an achievement that wasn't exactly of momentous importance because the only time on record was with a twin-engined job. But it was a good flight with lots of super service and among those on board was Sir Hudson Fysh, one of the founders of Qantas and presently board chairman, whom I have known since 1944 and see every year at IATA meetings around the world. He's a real airline pioneer.

CEDRIC O. TURNER
. . . driving force behind Qantas.

Sydney at night is quite a sight. The city is sprawled out over a big area. Not as many neon signs as one finds in a U.S. city, but very well and brightly lighted.

I was nearing the end of my Australian visit and had two fine finishing experiences. One was a drive with Qantas John Ulm and his wife along the coast north of Sydney and, take it from me, here is some spectacular scenery and wonderland for summer homes. One of the most attractive coastal areas I've seen in the world, being laced with rock points braced against the white-capped surf, and with fine beaches. There are few accommodations for tourists but thousands of cottages. There's even a Palm Beach, but it doesn't quite live up to the connotation of its name in the U.S.

And don't forget that Sydney harbor is one of the finest and most beautiful harbors in the world. You get some good views on a drive north.

On my last night I took John Ulm and his wife to Sydney's top restaurant, at least it was the best I could find, known as the Kinniel. It's in an old mansion near King's Cross, is rather French in atmosphere and has a good menu. In fact it is one of the handful of places in the entire country that makes an effort at Continental dining, and one of the few places open for something to eat and drink after 7 p.m.

I had something new for me, a carpetbag steak, a filet stuffed with oysters. Very good indeed. We celebrated my departure with some excellent French champagne. Next time you're in Sydney try the Kinniel. It's even a member of the Diners' Club, as are a few other places in Sydney and Melbourne.

On my final day in Sydney I spent more time at Qantas, one of the world's great air systems and something Australia can be very proud of. By this time I guess Qantas has moved into the very modern, handsome office structure which was being finishing when I was there. It was to be a real showpiece, probably one of the best airline offices to be found anywhere.

Sir Hudson Fysh was for many long years the guiding genius behind Qantas. As chairman of the board he has retired from day-to-day decision making but represents Qantas in IATA and in many other ways. But the driving force now is Cedric O. Turner, known as "C. O.," a tall, exacting executive who not only has vision but the determination and persistence to achieve his objectives. A visit to Qantas offices in downtown Sydney, or to the maintenance and operations headquarters at the airport, is sufficient to bear witness that Qantas is a major world-wide operation that has not only come a long way but is going much farther.

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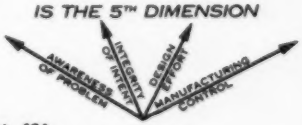

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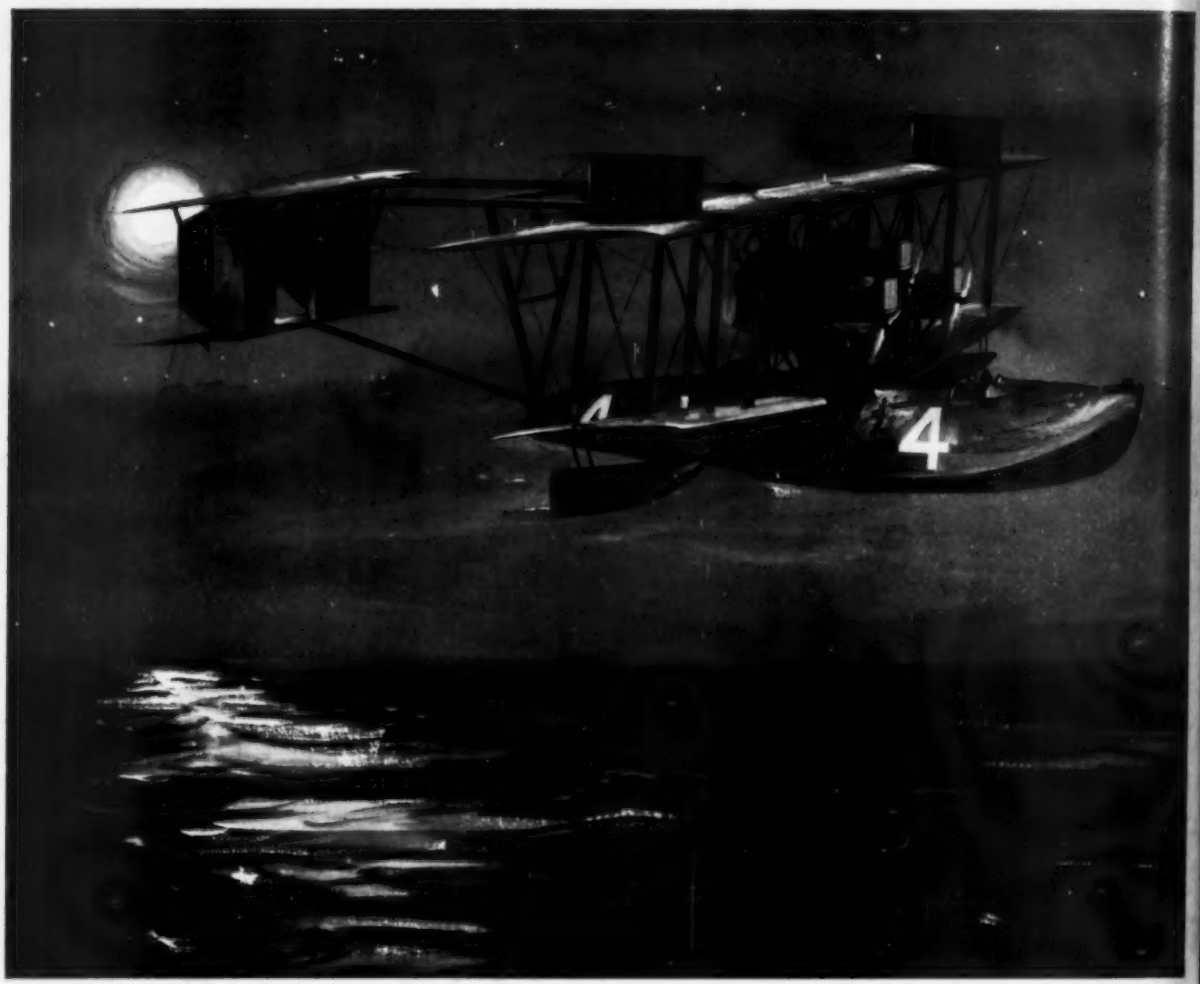

NC-4...*"Lame Duck"* that flew the Atlantic

In 1919, U.S. Navy flyers made plans to attempt their first transatlantic flight, in four NC's. The venture was dogged by hard luck. One of the planes burned in a hangar fire. On May 8, 1919, the three remaining flying boats took off for Europe, but the NC-4 was forced down near Chatham, Mass., and was dubbed the "Lame Duck" by newspapers.

However, after an engine replacement, the NC-4 joined the other planes in Newfoundland, and they took off from that point on May 16. The NC-1 and the NC-3 were forced down in the Atlantic, with no loss of life. The NC-4 kept going and 15 hours and 18 minutes after taking off it landed in the Harbor of Horta, Azores. From there it continued on to Ponta Delgada and Lisbon, Portugal. Total flying time of the NC-4 in this epic transatlantic airplane crossing was 26 hours, 45 minutes.

Thus the "Lame Duck" proved to be quite a bird.

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